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ABSTRACT

The dollar, energy, and labor costs of producing beef and soy protein are computed and compared, using input-output analysis. Both beef and soy protein in various forms are examined in detail from the farm level to the consumer level. For beef raised in the conrbelt region, a complete soybean meat-substitute is one-sixth as energy intensive as beef, while direct soybean consumption is one-ninth as energy intensive. Soybean protein saves the consumer money, energy, and reduces labor when compared to beef.

I. INTRODUCTION

The world crises of energy and food shortages seem to be racing to outdo each other. The food crisis is changing slowly from mass hunger to mass starvation. The energy shortage is so fundamental in its effect that most of the world has yet to realize what it portends. Energy shortfalls affect poor countries by interfering with machine driven irrigation of crops. The burgeoning industry and expectations of the developing countries are crimped by rising energy prices. But the energy shortages cause the greatest distress in the developed countries which are the most vulnerable and have the most to lose.

In particular, the specter of the energy shortage reaches for the great American breadbasket. For nearly fifty years, U.S. agriculture has disemployed farm-workers in exchange for expenditures on capital and energy. Beginning with the tractor and ending with the use of energy intensive fertilizers, herbicides and pesticides, the energy cost of grain production has risen to where the fossil fuel energy is nearly 20 percent of the energy content of the grain as it leaves the farm. This growing energy intensiveness of agriculture is in response to a growing demand for food given a finite amount of fertile land. First, work animals were displaced because of their demand for land and then artificial fertilizers were introduced to increase farm output further. The rising cost and inherent instability of farm labor was also a pressure to automate the agricultural process. Tractors and weed and insect poisons likewise replaced much labor. But, the mechanization of food production did not stop with the farm. Migration to the cities and rising per capita affluence created a demand for extensive food processing and packaging

and an intricate transportation network. These processes, of course, increased the energy and employment demands in the sectors between the farm and consumer. Today, the fossil energy cost of food on the U.S. dinner table is 700 percent greater than its energy content.* Those who left the farm now work in canneries (or the associated steel mills, etc.) or the wholesaling and retailing of food or in the food transportation system (or in the building of highways, etc.). Our social beliefs have convinced us that the ease (and complexity) of life today is somehow better than in earlier times. And today's life is physically easier and food is available in great abundance and variety at reasonable cost. Clearly these beliefs are buoyed by an ever rising stream of energy, used directly to capture the sun's energy and convert it to useful calories and protein, and energy used indirectly to provide the processing, packing, handling, transportation and home preparation.

Since the energy stores of the earth are clearly finite, since energy cannot be "recycled," since the population and expectations of the U.S. and the world are still rising, and since agricultural products are used increasingly to balance dollar world trade,** it behooves the U.S. to consider alternate ways to produce food. The energy cost of U.S. food calorie production is reasonably well known and it is clear that bread is the most efficient form. But "man shall not live by bread alone." Alternative protein production schemes have not been evaluated.

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*This situation is placed in absolute terms when compared to primitive agriculture where about one-fifth of the food energy was expended in its preparation.

**The imbalance in U.S. foreign trade is increasingly caused by the import costs of foreign autos and oil.

We have investigated the energy (and dollar and employment) cost of protein production and preparation in the U.S. via three basic systems: beef, processed soybean, and direct consumption of beans.

The soybean was chosen because it is the chief source of vegetable protein today in the U.S. and because it can be consumed directly after some cooking in the home

II. SYSTEM DESCRIPTIONS

A. Soybeans

The soybean system consists of the following steps: production on the farm; grain handling and storage; packaging; wholesaling; retailing; and preparation in the home. The vast majority of soybeans are grown in the midwest, although at least thirty states report some soybean farming [1]. After harvest, most (about 93%) [2] of the soybeans are routed to grain elevators where they typically require no drying. From the grain elevator, the beans that are destined for direct consumption are sent to a packager where they are packaged in one and two pound polyethylene bags [3], packed in shipping cartons, and sold to wholesalers [4]. The beans then proceed through the wholesaling - retailing - home chain.

One assumption deserves note here. The system, as described above, is almost non-existent in the U.S. today due to the low demand for soybeans for direct human consumption. However, an analogous system exists in the dried bean industry, which does occasionally involve the packaging of soybeans for human consumption [4],

B. Textured Soy Proteins

The textured soy proteins systems consist of the following steps: farm; grain handling and storage; oil extraction; milling; texturing; packaging; wholesaling; retailing; and home. The farm and elevator portions of the system are identical to the system described in II-A. From the grain elevator the beans are transported to soybean mills, which separate the beans into two basic products, oil and meal, typically by solvent extraction. Defatted soy flour is then sent to the texturing plant, very often operated by the same organization that operates the soybean mill, and often located nearby [5]. Here the soy flour is textured by the extrusion cooking process. (The other principal method of texturing soy protein, the spun fiber process, was not examined.) The textured soy protein is typically packaged in 50-100 lb. bags and sold to a variety of users, and in some instances is sold to packagers who repackage into retail size and sell to wholesalers [6, 7]. The packaged textured soy protein then proceeds through the wholesale - retail - home segments.

Note that most textured soy protein is not sold to consumers separately packaged, but is sold to consumers already mixed with ground beef. However, the system as described does exist, [6] and provides a mor[e] appropriate form for comparison.

C. Beef

The beef systems are comprised of the following steps: cow-calf program; feedlot; meat packing and processing; wholesaling; retailing; and home. The cow-calf program includes the birth of the calf and its maintenance until weaning. At weaning, it was assumed that the calves ar[e]

either sold to a feedlot or fed out by the original owner of the cow-calf enterprise. In either case, the operation will be termed a feedlot since each system provides the same product and each uses essentially the same materials. In this model, the cattle are assumed to be sold at a weight of 1,000 lbs. to a packing and processing enterprise for slaughtering and dressing. The wholesaling function is treated as a separate step in this model regardless of whether an independent wholesaler performs this step or the retailer performs it himself. The retailer cuts and trims the meat, packages it, and sells it to the consumer. The consumer must transport it to the home and prepare it.

III. GENERAL METHODOLOGY

A. Introduction

This investigation attempts to quantify the concept of energy cost. Each good and service, including energy itself, contains "embodied energy," in the same sense that a product, service or energy unit possesses a dollar cost. The concept is explained as follows:

All production is for final consumption. As classically defined, the final consumption activities of the society are carried out as it exhausts its disposable income on such items as food, clothing and cars; by consumers, industry, and government as they invest in homes, factories, or office buildings; and by the government as it spends tax revenues and other income on such things as national defense, research and development, highways, flood-control reservoirs, and health-insurance programs. (See Figure 1.) Exports, imports and inventory changes are also considered as part of final consumption.

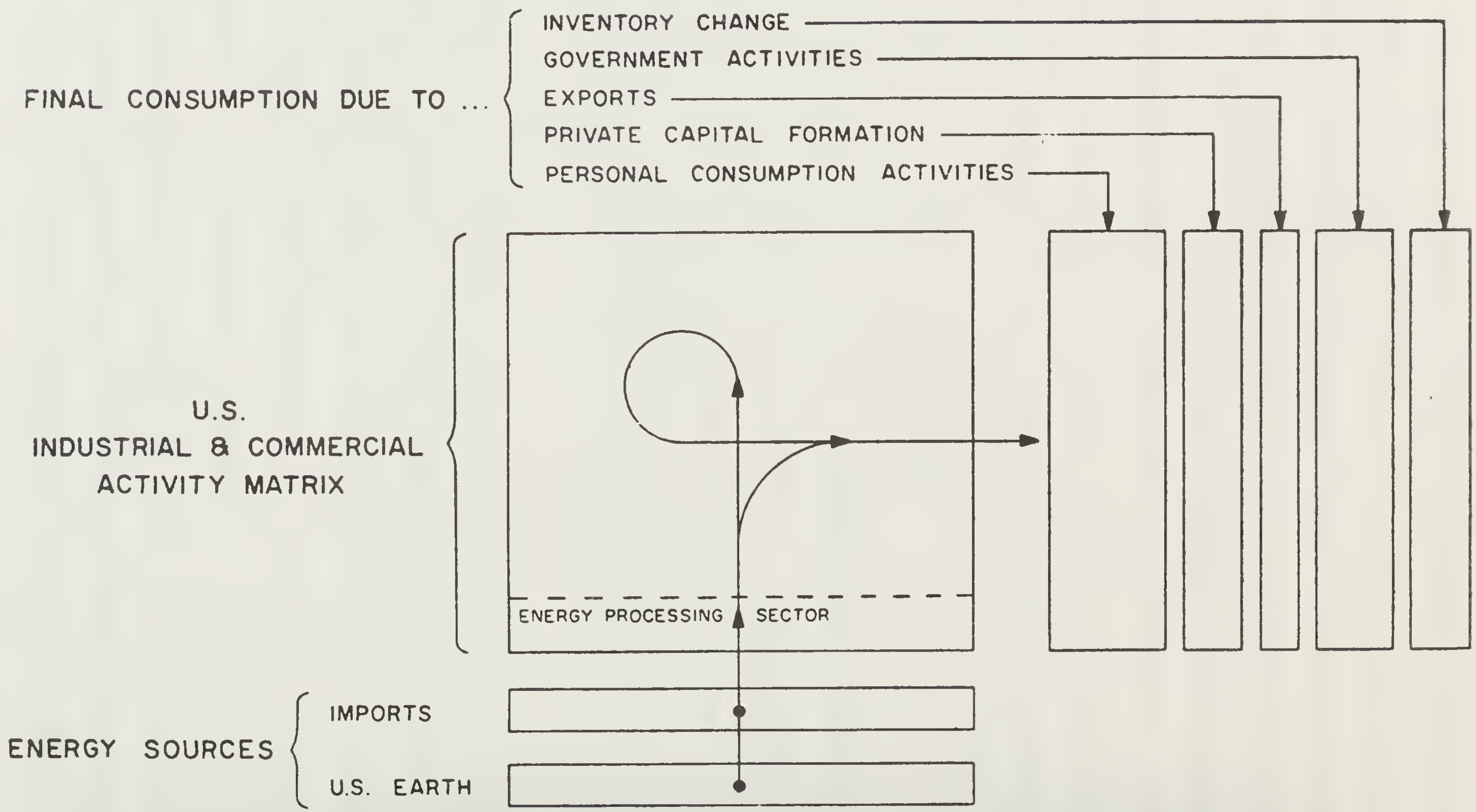

FIGURE 1. SCHEMATIC FLOW OF ENERGY THROUGH THE U.S. ECONOMY

The production process is made up of all the industrial and commercial establishments and public enterprises (government and non-profit) that carry on our highly complex pattern of interchanging raw and intermediate products as well as services, with the primary goal of supplying the demands for the array of consumption activities in which our society engages.

All domestic and imported energy is processed and distributed to various industrial, commercial, and government establishments or directly into channels of final consumption (to provide energy for home heating, cooling, lighting, cooking and for running appliances and autos). In the production process, energy is consumed and is thus "embodied" in the manufactured product or the service. Therefore, as resources are transformed into useful products and services, their embodied energy and dollar value increase. Imported products are considered to have been made by production processes similar to those of the U.S.; therefore, these products are assigned an embodied energy value similar to that of their U.S. counterparts. Embodied energy, plus directly imported energy, plus energy mined from the earth in the U.S. constitute the total flow of non-solar energy in the American economy, and like dollar income, must be accurately assigned to the various items of final consumption.

These energies can be quantified by the technique of input-output modeling. Immense amounts of dollar data are gathered routinely about the detailed demands and outputs of U.S. industrial-commercial activity. The dollar data are organized by the government into a matrix of transactions within the various sectors for a given year. By specialized data collection and matrix manipulation the dollar flows are transformed

into energy flows, using units of energy (Btu)[1] to measure the inputs and outputs of the energy sectors (coal, crude oil, refined petroleum, natural gas, and electricity), and using dollar values to represent the quantities of all the other inputs and outputs. This set of activities is then transformed into a matrix representing the total energy requirements for the various activities of final consumption. In this manner, all non-solar energy, direct or embodied, is assigned to the appropriate activities of final consumption in the United States. In a somewhat similar manner, "embodied employment" (total or by occupation) can be determined for the activities of final consumption. This process has been described in detail [8].

Using the energy model, the ERG allocated energy and employment over the various activities of final consumption for 1963 and 1967. Because of the complex and expensive process of gathering data, no more recent data are available from the federal government. Sensitivity, error-analysis, and projecting techniques have been developed to help overcome older and potentially inaccurate data. Linear modeling of this kind is not without difficulty.[2]

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[1]British Thermal Units: approximately enough heat to raise one pound of water, one degree Farenheit. One Btu equals 1,055 joules.

[2]The model assumes all changes in final consumption will produce average or proportional changes in the inputs to the affected industries. Actually, the changes may be marginal, depending on the nature of the processes involved and on the relationship to full production capacity. In general, however, processes operating at minimum long-run cost levels have a nearly identical average and marginal response to changes in production.

B. Research Approach

Through the use of these Input/Output (I/O) techniques, several matrices have been generated that were used in this study [9]. For each I/O sector, this matrix contains energy coefficients for the five types of energy, coal, crude oil, refined oil, electricity, and natural gas, and a total energy coefficient. These coefficients are the total number of Btu's used to produce $1.00 of product in 1967 producer's prices in that sector (Btu/Btu produced in the energy sectors). To find the total number of Btu's required to produce a product, one must first select the I/O sector in which it belongs and multiply that product's price in 1967 producer's prices by the energy coefficient in the matrix.

There are several problems with this method, however. Because of the producer's prices limitation inherent in I/O analysis, the matrix coefficient does not include the energy used to transport, wholesale, retail, and prepare the product at home. The I/O categories are also quite general, with many products aggregated in each I/O sector. For example, I/O sector 1401 Meat Products includes a wide variety of sometimes quite different products.

Our approach was to attempt to find all the materials, labor, energy and capital costs that are used in producing protein in the forms we selected, beef and soy protein. We tried to account for each input to the system by breaking the production of protein into sub-systems consistent with actual market practices and available data. For example, the production of beef protein is subdivided into the areas of cow-calf program, feedlot, meat packing and processing, wholesaling, retailing and

home preparation. Each subdivision was then studied to find all costs that are part of that subdivision. As a check, we tried to account for the price of a commodity by finding enough input costs to equal the price. Because profits were often difficult or impossible to ascertain, and because costs and prices do not always match in an imperfect economy, this was only a guideline. Each cost represents an input to that subdivision. The actual generation and use of the data is detailed in Appendix D.

Each input was generally in some form of dollars/unit output. For example, inputs to the farm subdivision for soybean production were in dollars/bushel soybeans. (The base year of our study was 1973.) The energy coefficient matrix was then used to find the total number of Btu's used to produce each input.

Because the energy coefficient matrix is in 1967 dollars (1967 being the most recent year that complete I/O data is available), each input must be deflated to 1967 dollars for use with the matrix. This deflation is discussed in Appendix A. The resulting number of Btu's found however, reflect 1967 technology and energy efficiencies of that time [10]. An adjustment was made to the number of Btu's to try and take this technological change into account. Because the matrix is in units of Btu's/$, the adjustment was made by multiplying the number of Btu's by the ratio of the total energy used in 1973 to the total energy used in 1967 divided by the ratio of the GNP for 1973 (in constant 1958 dollars) to the GNP for 1967 (in constant 1958 dollars) [11]. This ratio is about 1.03.

This method does not completely solve the producer's prices problem because each input is multiplied by an energy coefficient that is

Btu's per 1967 dollar in producer's prices. An adjustment could have been made if we could have ascertained which inputs were in producer's prices, which at wholesale prices, and which were at retail prices. When the farmer grows his own product to feed his beef cattle, his cost is in producer's prices. If he purchases inputs, they may be at the wholesale or at the retail level, or perhaps he avoids both of these sectors.

A matrix corresponding to the energy matrix contains labor coefficients that were used in developing the total number of jobs used to produce protein. These coefficients are given in Jobs per 1967 dollar (producer's prices) and Jobs per Btu for the five energy sectors. An analogous procedure was followed in using this matrix. Instead of a technological adjustment as was needed for the energy calculations, a labor productivity adjustment of 1.162 was used to keep all figures in 1973 units [12].

Certain inputs were not in a form that could be used with the matrix, usually because the input was not disaggregated enough to allow its certain classification into an I/O category. Each of these inputs were studied separately and energy and labor costs were estimated. The inputs that were not used with the matrix are the ones in Tables A - R3, which have an I/O number greater than 357 (358, 359, 360, 361). Inputs that were labeled miscellaneous were allocated proportionally on the basis of all other dollar inputs to that subsystem.

Because there was no corresponding "land coefficient" matrix, an independent study of some of the land aspects involved was done. This is discussed in the next section.

C. Land Requirements

There are two principal types of land inputs for the protein systems studied: land to grow crops (which are either the end product or an input to cattle raising) and grazing land. All other land (e.g., the acreage of the feedlot, the portion of the retail store devoted to beef) was ignored.

SOYBEANS - the only land input into the soybean system considered was the land actually devoted to growing the soybeans. After allowing for packaging loss, the land required is readily ascertainable from data on yields [1

TEXTURED SOY PRODUCTS - Again the only land input considered was the land devoted to raising soybeans. The calculations are analogous to soybeans. An allocation then had to be made to account for the dual products problem [15].

BEEF - The inputs to the different beef systems were examined, and inputs requiring land of the above-mentioned two types were translated into actual acres. The inputs, expressed in dollars per retail pound, were converted to physical units using prices from the original data sources [13 These were then converted to acreage requirements on the basis of average 1973 yields [14]. For soybean mean and cottonseed meal, there was a further allocation [15].

Grazing land is a major land input to beef production. It is often argued that this land has no other use for man. While this may be true, we must realize that grazing land is available for only a fraction of the year (about 3 months) and that large amounts of cropland are needed to support beef production during the remainder of their maturation process.

D. Normalization to Protein Basis

This study determines the dollar, energy, labor, and land (DELL) costs of delivering protein to consumers by way of different food systems. The protein considered in this study is utilizable protein, a concept which encompasses two ideas: (1) not all food contains the same amount of crude protein, and (2) not all crude protein is of the same quality. Crude protein content is fairly well established for different foods; the values, expressed as a percent by weight, as used in this study are as follows: soybeans, 38% [16]; textured soy analogs and extenders, 52% [17]; beef, 17.7% [16].

This is only part of the picture, however. The proteins are of differing value to the human body due to variations in amino acid balance. A discussion of protein quality and the various techniques of measuring protein quality is beyond the scope of this paper. The measure used in this study was net protein utilization (NPU) value. Very generally speaking, it expresses the percent of nitrogen consumed by a test group of rats which is absorbed into the body tissues. The values used in this stody are as follows: soybeans, 61.4 [16]; textured soy analogs and extenders, 64.7 [18]; beef, 66.9 [16].

Combining the crude protein content with the NPU value gives us an idea of utilizable protein. For example, 1 pound of soybeans is 38% crude protein, or .38 lb. protein. Combining this with an NPU value of 61.4 gives us .233 lb. of utilizable protein. Similar calculations were made for all systems in order to convert the data from a weight to a utilizable protein basis. Results are normalized on a basis of "per pound of utilizable protein." For example, the energy cost of

1 pound of soybeans "on the table" is about 21,000 Btu's; therefore, 1 pound of utilizable protein "on the table" delivered by the bean system would have an energy cost of (21,000 Btu/lb. soy bean)/(.233 lb. utilizable protein/lb. soybean) ≅ 90,100 Btu/lb. utilizable protein.

Several considerations deserve note at this time. First, NPU values are only one of many measures of protein quality. Its choice must be considered at least semi-arbitrary. Second, this analysis ignores the supplemental effect of a balanced diet. We are in effect assuming that these foods are eaten alone. Third, the effect of cooking on protein values is somewhat uncertain. The NPU value for beef is an average which includes some studies using cooked beef. Cooking generally increases the quality of soy proteins [19], and hence the values for uncooked which were used are probably low. Finally, a further calculation was necessary in order to put the food systems on a comparable basis, as explained in the next section.

E. Soy Oil Method of Removing Effect of Calories

Since this report is concerned with the costs of protein, an adjustment had to be made in order to remove a further impediment to comparing protein produced by the different food systems. This impediment was that in addition to delivering protein, the foods also provide calories to consumers and the amount of calories differs from food to food.

A variation of the "least cost alternative" approach common to cost/benefit analyses was used. It assumes, in our particular application, that if consumers were not getting calories through these foods that they would obtain these calories from the least cost alternative source of

calories. Our choice for the least cost alternative source of calories was soybean oil. This choice was made for the following reasons: (1) data which had been collected for basic computations for the TSP portion of the study could be easily adapted to soybean oil; (2) soybean oil is a concentrated source of calories which is relatively inexpensive.

The dollar, energy, labor, and land costs of soybean oil up to and including the extraction process were available from the basic data from the TSP material. The dual products problem was "solved" by allocating the dollar, labor, and land costs on the basis of total dollar value of the products and allocating energy cost on a weight basis [20].

The dollar, energy, and labor costs of refining and packaging the soy oil were estimated by examining Census of Manufactures [21] data for the cooking oil sector, in conjunction with the Energy-Employment matrix model described earlier. The dollar cost was the implicit price from the Census of Manufactures [22], adjusted to the retail level [23], and inflated to 1973 prices [24]. The energy and labor costs were (1) the inherent costs already calculated plus (2) the direct energy and labor of the cooking oils sectors, normalized to a per unit basis, plus (3) wholesaling and retailing [25]. The energy and labor costs were then adjusted to 1973 [26].

The land cost of soy oil per pound did not change after the oil extraction process.

The dollar, energy, labor, and land costs of soybean oil having thus been calculated, the effect of calories was removed from the costs of the beef, TSP, and bean food systems by subtracting out the costs of the amount of soybean oil required to deliver the associated number of calories [27].

IV. RESULTS

The dollar, energy, labor and land costs per pound of utilizable protein, after removing the costs of calories, are given in Table 1. The results readily show the enormous differences in costs between the plant and animal systems. The beef systems require more processing and preparation which, combined with the inherent inefficiencies of the animal itself, account for the order of magnitude difference in all categories. Obviously, the consumption of beef is an expensive habit in more ways than one.

The results from Table 1 may perhaps appear more meaningful if put on a per capita basis. In 1973, per capita beef consumption totaled 81.1 lbs. of retail cut equivalent [29], or 9.6 pounds of utilizable protein.* If we assume the beef came from a system analogous to the one we have labeled Corn Belt, then we can calculate the costs of this beef protein. These 9.6 pounds of utilizable protein would have "cost" \$100.72, 5.716×10^{6} Btu, 9.74×10^{-3} man-yr., and .55 acre. If the 9.6 pounds of utilizable protein had been obtained from Unitex, a meat analog, they would have cost \$15.07, 9.1×10^{5} Btu, 7.83×10^{-4} man-yr .001 acre. Similarly, if obtained by the bean the per capita costs would have been \$9.98, 6.30×10^{5} Btu, 8.01×10^{-4} man-yrs., .002 acres.

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* 91.1% domestically produced.

SYSTEM DESCRIPTION		DOLLAR	ENERGY 100,000 BTU	EMPLOYMENT Thousandths of a Job	LAND Hundredths of an Acre (% Grazing Land)
BEEF (Cow-calf and Feedlot)	Inter-Mountain	10.08	5.96	0.93	430.61 (98.90
	Texas	10.53	5.61	0.80	53.78 (96.1)
	Cornbelt	10.49	5.95	1.01	5.72 (59.1)
PROCESSED SOY BEAN	T.S.P. (Textured Soybean Protein - an additive)	1.48	0.84	0.072	0.010 (0)
	Unitex (a meat analogue)	1.55	0.94	0.082	0.010 (0)
UNPROCESSED BEAN		1.01	0.66	0.083	0.0190 (0)

TABLE 1. The Dollar, Energy, Employment, and Land Costs of Protein Production in the U.S. (1973), Per Pound of Net Utilizable Protein.* (Costs cover the entire system from seed planting to the table.) (Corrected for caloric content differences using impacts of soybean oil.) (Source: Reference 18)

*Net utilizable protein is an empirically determined value based on growth of test animals per unit of protein consumed.

	COST MARGIN $/LB.	% OF TOTAL	TOTAL COST $/LB.	NRG MARGIN BTUS	% OF TOTAL	TOTAL NRG BTUS	JOBS MARGIN HUNDRED THOUSAND MAN-YRS/LB.	% OF TOTAL	TOTAL JOBS HUNDRED THOUSAND MAN-YRS/LB.
Farm	0.0791394	11.3	0.0791394	4848.2	13.4	4848.2	0.580269	14.2	0.580269
Grain Handling & Storage	0.00724400	1.0	0.0863833	363.0	1.0	5211.3	0.072481	1.8	0.652751
Oil Extraction	0.00338607	.5	0.0897694	1526.6	4.2	6737.9	0.0278105	.7	0.680561
Milling	0.0953656	13.6	0.185135	417.9	1.2	7155.8	0.0335683	.8	0.714130
Unitex	0.0887298	12.6	0.273865	6482.4	17.9	13638	0.640387	15.7	1.35452
Packaging	0.183370	26.1	0.457235	10456.5	28.8	24094	1.19837	29.4	2.55288
Wholesaling	0.0378400	5.4	0.495075	1055.4	2.9	25150	0.383376	9.4	2.93626
Retailing	0.181002	25.7	0.676076	2291.3	6.3	27441	0.916174	22.5	3.85243
Home Preparation	0.0270240	3.8	0.703100	8867.2	24.4	36308	0.222486	5.5	4.07492

TABLE 2. UNITEX

	COST MARGIN $/LB.	% OF TOTAL	TOTAL COST $/LB.	NRG MARGIN BTUS	% OF TOTAL	TOTAL NRG BTUS	JOBS MARGIN HUNDRED THOUSAND MAN-YRS/LB.	% OF TOTAL	TOTAL JOBS HUNDRED THOUSAND MAN-YRS/LB.
Cornbelt Cowcalf	0.45724	32.9	0.457240	15016.3	20.2	15016.3	5.05576	38.6	5.05576
Cornbelt Feedlot	0.429758	30.9	0.886998	20609.9	27.7	35626.2	2.95876	22.6	8.01452
Meat Packing	0.0580004	4.2	0.944999	3780.5	5.1	39406.7	0.512427	3.9	8.52695
Wholesaling	0.0999300	7.2	1.04493	2909.6	3.9	42316.4	1.02240	7.8	9.54935
Retailing	0.283004	20.4	1.32793	8592.6	11.6	5090.9	3.14455	24.0	12.6939
Home Preparation	0.0620650	4.5	1.39000	23466.3	31.6	74375.3	0.403868	3.1	13.0978

TABLE 3. CORNBELT

Tables 2 and 3 show the breakdown of total costs for cornbelt beef and unitex by showing the costs of each step in the systems [30]. (The individual inputs and associated costs of each step for all six food systems are given in Appendix E.) These numbers are on a retail weight basis, so they differ from the values given in Table 1. However, the percentages are applicable to both, since all inputs within a given system are changed proportionately when put on a protein basis.

V. DISCUSSION

The initial results are not surprising: switching from beef protein to a soybean meat substitute saves the consumer money while also reducing energy use, employment, and the demand for agricultural land. In terms of beef raised in the cornbelt, a complete soybean meat substitute is one-sixth as energy-intensive when compared on a unit protein basis; direct soybean consumption is one-ninth as energy intensive.

But a switch from beef to vegetable protein would also reduce the employment required and the total consumer dollar costs. If total U.S. spending is to be maintained, as is likely at least in the short run, the consumer will spend these dollar savings on something else, and that consumption will require energy and employment increases which would tend to offset the energy savings and employment losses obtained within the food industry.

If we assume that the consumer spends his dollar savings on general personal consumption [28], then the net impact on the economy of a voluntary shift from beef to vegetable protein is an increase in energy consumption and a decrease in total employment: approximately

70 million Btu and 1/5 of a job per 1,000 pounds of net utilizable protein [101]. The reduced demand for agricultural land of 27 acres of cropland per 1,000 pounds of protein would probably remain unchanged as consumers spend their savings on other forms of personal consumption.

We do not know the direct and indirect demands for land through the various forms of personal consumption. However, under the average respending scenario, it is conceivable that the demand for forest and cotton land would increase slightly as more lumber, paper products, and clothing would be required.

Since the average person in the U.S. directly consumes about 8.75 pounds of domestically produced net utilizable beef protein each year [29, 101], the total effect of a voluntary switch from beef to the soybean meat substitute would be a decrease of about 396 thousand jobs, an increase of some 22 million barrels of oil (energy equivalent) each year, and a decrease in the use of nearly 50 million acres of cropland (considerably more grazing land).

We could also assume that the average consumer would focus the dollars saved in the switch to vegetable protein on the nonenergy items of average personal consumption. In this case, about 55 million barrels of oil (energy equivalent) would be <u>saved</u> each year and about 360 thousand jobs would be lost. The net result on the demand for land would be essentially unchanged from the previous scenario. Capital investment increases would be needed only to supply the increase in general personal consumption.

Of course, the above calculations are based on the average and not on the marginal costs of protein production. Even if average and marginal

costs are equal under current production, they would not remain so as beef production declined and vegetable protein production increased. The difference in energy costs, however, would probably increase as the shift occurs, since the former will become less efficient and the latter more efficient. The dollar cost difference is not likely to change appreciably as long as some market competition prevails.

The ratio of the energy cost differences to the difference in dollar costs will increase relative to the energy intensity of personal consumption. Therefore, the probable lower bounds of the effects of the voluntary shift were the ones calculated. By similar reasoning,* an energy cost increase should decrease the net energy and increase the net labor required per pound of substituted protein.

This respending effect is a difficult dilemma for a nation bent on reducing energy use. What are the possible solutions? The government could ban meat production and tax vegetable protein, then spend the tax on an activity such as postal services which is sufficiently labor intensive to offset those jobs that would be lost and uses small enough energy amounts so that a net energy savings and an employment increase would result. The average wage would have been lowered under such a change, especially in relation to the cost of a unit of energy. The tax could be used to subsidize the construction of new energy supplies, such as electric power plants. But here the money would create fewer jobs and use more energy than it would in personal consumption, thus exacerbating the above dilemma.

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*Assuming that the most energy- and labor-intensive of the two processes are increased and decreased in intensity the most, respectively, by an energy price increase.

The government could absorb the tax as a reduction in the money supply, but this would reduce total economic activity and, in the short run, further reduce employment via the multiplier effect. Under this scenario, wages would slowly decrease until full employment is reached. Again, wages would be reduced relative to the cost of energy.

Anything that would raise the cost of energy, such as an energy tax or an energy-rationing program, would speed the process of substituting labor for fossil energy. The resulting increase in the labor intensity of the economy could possibly be structured to completely offset the loss of jobs resulting from the switch in protein sources. The revenue produced by an energy tax should be returned to the consumer as a reduction in the income tax [98]. Presumably, the consumer would lower his overall energy demand by redirecting purchases to less energy-intensive goods and services. In the short term, this behavior would be equivalent to an increase in energy efficiency. But in the long term, it is likely that the effect of the tax (and energy rationing) would lower real income because it would make the economy more labor intensive.

It is clear from the data that obtaining protein through fed-beef is one factor contributing to our energy problems. Whether this practice is so embedded in our culture as to foreclose the adoption of policies to discourage it remains to be seen.

VI. APPENDICES

A. Deflation

Data could not be obtained in sufficient detail for any one year. The base year used was 1973 because of the greater availability of both data and published price indices for that year. Because the energy coefficients of the matrix are in Btu's/67$ in all but the energy sectors, all dollar costs of inputs must be deflated to 1967 dollars for use with the matrix.

This step presented several problems. Indices are often published for commodities in very general groups. All commodities within the general groups change prices at different rates. The most accurate index is the index that most closely fits the input to be deflated. Specific indices are not available for many items in our economy. In these cases, the index was selected from those available that were felt to represent the input commodity in question. In some cases where no index seemed to include the input commodity, the most closely analogous index was chosen. Much time and effort was expended in matching the index and commodity as accurately as possible but these selections were often matters of judgment. Where actual indices were not available, indices were generated using known prices for 1967 and the year in question. All dollar data was first deflated to 1973 if from another year as 1973 was our base year and then was deflated to 1967 for use with the coefficient matrix. Information for deflation was obtained from five different publications [31]. The source for each index is noted in Tables A - R3 by the 3 letter code in the deflation column.

B. Energy - Amounts and Prices

In most cases, data on energy use is given in terms of dollars of energy used. Often this is the only data available -- a farmer at best may know what he spent on electricity; he will not keep track of how

many kilowatts he used. The energy matrix coefficients are stated in Btu/Btu in the energy sectors. In other words, for each Btu of electricity used, we know that about 2.8 additional Btu's were used to generate and transmit the one Btu used. To calculate how many total Btu's a farmer used as electricity, the dollar figure must be converted to the physical units of Btu's. Because the price of electricity is in dollars/kWh and there are 3413 Btu/kWh, the dollar amount of electricity can be converted to physical units by using the price of electricity. The same is true for dollar amounts of other types of energy.

Electricity prices, however, illustrate the difficulties involved with finding prices. The price of electricity varies with the amount used and the location. Commercial users pay different rates than small commercial users. Because of these problems, an average price of each energy type was used. Averages, of course, are never completely accurate. Given the complexity of selecting accurate prices for each particular operation involved and the impossibility of being accurate when the data being used are averages, we felt that the use of an average price was the best method for this study. The average prices used are the following:

TYPE	$ 1973 PRICE	SOURCE
Electricity	.022/kWh	Stat. Abst. 74 [11]
Coal - bituminous	8.25/sh.Ton	Stat. Abst. 74 [11]
Fuel Oil # 2	.2275/gal.	API - Basic Pet. Data Book [99]
Natural Gas - Industrial	$.50/10^6$ Btu	AGA - Gas Facts 1974 [100]
Natural Gas - Commercial	$.95/10^6$ Btu	AGA - Gas Facts 1974 [100]
Natural Gas - Residential	$1.25/10^6$ Btu	AGA - Gas Facts 1974 [100]
Diesel Fuel - Farm	.227/gal.	Ag. Stats. 74 [14]
Gasoline - Farm	.337/gal.	Ag. Stats. 74 [14]
Motor Oil - Farm	2.00/gal.	Ag. Stats. 74 [14]

C. Labor

The labor coefficient matrix used gives the number of jobs/Btu in the five energy sectors and jobs/$ in all other sectors. Then for each dollar input to our system, there is a number of jobs that went into producing that commodity. The labor directly used to produce protein, such as the farm worker on a cattle farm, is expressed in dollars because dollars are the units businesses keep records in. To find out how many jobs a dollar figure represents, the price of the labor (wages) must be known. One job was assumed to be 50 weeks a year, 40 hours/week. Wages for the different industries were then used to calculate the jobs, or man-years each dollar figure for labor represents. Because labor costs were often aggregated into one figure, an average wage for that industry or for a similar industry was used. The following average wages were used:

TYPE	73$/Job	SOURCE
Farm Labor	4,737	Ag. Stats. 74, p. 436 [14] labor without room and board
Farm Management	11,332	Ag. Stats. 74, p. 468 [14] net income of farm operators
Food Processing	7,660	Marketing & Trans. Situation. p 16 [56]
Food Wholesaling	7,660	MTS p. 16 [56]
Food Retailing	6,540	MTS p. 16 [56]

D. Detailed Research Notes

(1) TSP and Unitex Systems

(a) Farm

The basic source of information relating to the dollar costs of growing soybeans, 1973, was a publication of the Department of Agricultural Economics, University of Illinois [32]. These figures are for central Illinois. Several categories were too general to allow use of the I/O energy model, and were broken down as reported below.

Overhead expense was itemized using farm records which were the data base for reference [32] by a member of the Department of Agricultural Economics, University of Illinois [33]. Similarly, "machinery repair, fuel, and hire" was broken down to "machinery repair," "fuel," and "machinery hire." Fuel was split into diesel and gas according to the estimated statewide average proportionate shares of the two: 60% diesel - 40% gas [33, 34, 35] and converted to physical units [33] to conform to the CAC I/O energy model.

The dollar cost of transportation to the elevator was determined by using a unit cost per mile figure for corn [36] and adjusting it by a factor of $\frac{\text{60 lbs. soybeans/bu.}}{\text{56 lbs. corn/bu.}}$. Energy and labor costs of transportation come from [38].

Table A lists the costs of farm production of soybeans as used in this study.

(b) Elevator

The basic data source used to obtain elevator operating costs was reference [37]. The estimates for 1973-74 were used rather than

the 1971-72 figures, in keeping with the goal of 1973 as our base year. The country elevator classification was used since the vast majority (>80%) of midwestern grain goes to these types of facilities [2]. A "composite" country elevator was developed based on total amount of grain handled [39] [44]. These figures are for storing and handling only, and hence understate slightly. However, soybeans rarely need drying, and the understatement is felt to be minimal.

Utility expense was allocated entirely to electricity, since it was felt that at least 95% of this category was electricity [39]. Average electricity prices [40] were used to obtain a physical quantity of electricity.

Table B lists the costs of the grain elevator step as used in this study.

(c) Soybean Processing

Information on soybean mill operations was obtained from a large soybean processor that wishes to remain anonymous. The figures represent an average of four mills, and are felt to be typical of the industry at large. Again, it is assumed that all soybeans come to the mill from elevators.

A rather severe problem arises when one attempts to allocate operating costs between the dual products of soybean mills, i.e., the oil and the meal. However, it was decided that dollar and labor costs should be allocated according to the total dollar value of the two products, and energy costs according to the physical outputs, i.e., on a weight basis. These allocation factors were derived from

reference [41]. On the basis of dollar value, the allocation factors were: oil, 37.6%; meal, 62.4%. On a weight basis, the allocation factors were: oil, 18.38%; meal, 81.62%.

Another difficulty was that figures from the anonymous soybean processor did not include milling of defatted soy flakes into flour, the input into the texturing step. Therefore, an estimate of the dollar cost of this particular step was obtained from industry sources [42, 43] and allocated solely to the meal.

Transportation expense from grain elevator to soybean processor is an average figure obtained from a large Illinois soybean processor [17], and represents a trip length of about 100 miles.

Direct energy consumption figures were provided by the anonymous source in physical units; energy prices for this step were likewise obtained.

Table C lists the operating costs of the soybean processing step as used in this study.

(d) Texturing

Information on texturing was obtained from the engineering department of Wenger International, Inc., a manufacturer of extrusion cooking systems [45]. Wenger provided operating costs per unit of output for the extrusion cooking and texturing process and also furnished utility consumption in physical units. Several figures supplied had to be adjusted, as described below.

The textured soy protein was assumed to be packaged in 50-lb. bags at a cost of 20¢/bag, or .882¢ kg. [45]. Steam production was assumed to be produced 80% by fuel oil and 20% by natural gas [45].

Average prices [40] were used to convert to physical amounts of fuel oil and natural gas. The energy conversion used was 1000 Btu/lb. steam [46]. Water volume was converted to dollar cost using an average of Kansas City, Missouri, and Champaign, Illinois, water rate structures [45, 47]. Transportation from soybean mill to texturing plant was ignored. An industry expert [48] estimated that 80% of all textured soy protein is produced at locations having both a soybean mill and a texturing plant.

Table D1 lists the costs of TSP texturing as used in this study.

Table D2 lists the costs of Unitex texturing as used in this study.

(e) Packaging

The packaging step is one for which detailed cost breakdowns were not available. Hence, a number of assumptions and calculations need to be detailed at this point.

Textured soy protein is currently available in 12 oz cartons resembling quart milk cartons [49]. Hannon [50] has determined the energy content of similar cartons, and it is these figures which provide the basis for our calculations. From reference [50], the energy content of the carton is 17,400 Btu/lb. of finished carton. The textured soy protein container weighs 1.85 oz. [51]. However, the carton is 3.8% aluminum (by weight)[51]. Therefore, we subtract out the aluminum and get .111 lb. paper.

(.111 lb. paper/carton) (17,400 Btu/lb. paper) = 1935 Btu/carton.

We now add in the aluminum, assuming an energy content of aluminum of 60,820 kWh/ton [52].

$$\frac{60{,}820 \text{ kWh/ton}}{2000 \text{ lbs/ton}} \quad (.0046 \text{ lbs. Al/carton}) = .14 \text{ kWh} = 477 \text{ Btu/carton.}$$

Finally, we assume (perhaps not too irrationally) that the packaging of textured soy protein in cartons is similar enough to milk packaging (minus the energy of homogenization and pasteurization) to allow us to use the figure given, 2710 Btu/carton.

For paper and aluminum the energy coefficient from the corresponding sector in the energy matrix was used to calculate an implicit price, which was the sale input. This was necessary in order to develop a labor cost.

The cost of transporting TSP to the packager is the amount paid by a packager of this type, representing a distance of about 200 miles [54].

Shipping cartons cost approximately 8¢/carton in 1973 [53]. The energy matrix was used to calculate an energy content of 7848 Btu/carton, or 876 Btu/lb. dry TSP.

Table E lists the energy figures and dollar costs of packaging as used in this study.

(f) Wholesaling

Although technically speaking the packaged textured soy protein system that was investigated is not handled by a wholesaler, it does go to the central warehousing unit of the chain which retails the finished product. This was felt to be analogous to a wholesaling step, however, and it was desired that the impact of this step be known.

An "average" markup [55] by the wholesaler was assumed, and costs were allocated according to nationwide wholesaling averages [55].

This was possible since the price to the wholesaling unit was obtained [54]. Transportation expense to the wholesaler is the actual cost paid [54].

Table F lists the costs of wholesaling as used in this study.

(g) Retailing

The costs of retailing the textured soy protein were obtained from a study of cost margins for the category "dry grocery." [56] The average mark-up and costs listed as a percent of sales were usable because cost to the retailer of the textured soy protein was known (assumed to be the cost to the wholesaler plus his mark-up).

The transportation cost is based on an average cost of $10.80/ton for transporting groceries from warehouse to retail store [57].

There is a rather large figure of "unallocated" due to the fact that taking an average mark-up and retailing cost brings us nowhere close to the price that the retail textured soy protein carries. We assume this represents profit and is given no energy or labor cost.

Utilities were allocated in a manner analogous to wholesaling.

Table G lists the costs of retailing as used in this study.

(h) Home

Data on the home preparation of textured soy is almost non-existent; therefore, several assumptions were made.

For cooking purposes, it was assumed that textured soy protein cooking requirements were the same as beef on a per pound basis. Hence, the DEL costs of cooking a pound of dry textured soy protein are the same as one pound of beef. Similarly, the capital DEL costs of cooking are assumed to be the same for a pound of dry textured soy protein as for one pound of beef [58]. Textured soy

protein requires no refrigeration and hence no share of refrigerator operating or capital DEL costs were allocated to it.

Transportation DEL costs of a pound of dry textured soy protein were assumed to be the same as one-pound of beef.

Table H summarizes the home part of the textured soy protein system.

(2) Bean System

(a) Farm

The farm inputs and methodology are the same as described under "Farm" in the TSP system.

(b) Elevator

The elevator inputs and methodology are the same as described under "Elevator" in the TSP system.

(c) Packaging

The packaging step in the bean system represents an area of greater uncertainty than other steps in any of the systems. Attempts were made to analogize whenever possible to the dry bean industry. The packaging step was analyzed in terms of six inputs: heating, lighting, machinery operation, direct factory labor, materials consumed, and capital. Each will be discussed separately.

For purposes of heating, a packaging building was hypothesized based on the dry bean industry's packaging operations. A building of dimensions 100' x 200' x 30' was assumed [59]. However, only the packaging area is heated; the warehousing area is typically not heated in order to minimize evaporation loss [60]. The packaging area was assumed to be 30' x 30' x 30' [60]. The calculation of the heating

requirements assumed a climate similar to a central Illinois city [61]; a coefficient of conductance for the building of .3 Btu/hr. - $ft.^2$ - °F [62]; and an infiltration rate of 1 complete turnover/hr. [63]. Thus, heating requires 2.655×10^8 Btu/yr. [64]. It was decided to allocate this 50-50 between heating oil and gas. Labor was calculated from the CAC employment model.

The estimate of energy and dollar cost of lighting is from a lighting industry expert [65]; it assumes a packaging operation 30' x 30' x 30' which operates ten hours per day, five days per week, fifty weeks per year, and a warehousing operation 100' x 170' x 30' which operates 24 hours per day, five days per week, fifty weeks per year. The labor costs were figured by using the electricity cost together with the CAC employment model. The capital costs of lighting were ignored.

The requirements for machinery operation were formulated from discussions with packaging industry experts [66, 67] as to the nature of the equipment necessary and their particular energy requirements. Again, it was assumed that the operation ran 10 hours per day, 5 days per week, 50 weeks per year. The total yearly electricity requirement was estimated to be 71,490 kWh [68]. Combining this with an average cost of electricity of 2.2¢/kWh [40] gives a dollar cost of $1,572.78. Again, labor costs were derived from the CAC Employment Model.

Direct factory labor represents a rough estimate from dry bean industry experts [3, 69] of the labor and dollar cost per one-pound package. No energy cost was assigned to this input.

Materials consumed consisted of polyethylene (for bags) and paperboard (shipping cartons). The paperboard cost came from persons

in the dry bean industry in the form of a dollar cost, which was used to determine the energy and labor costs through the use of the CAC Energy Employment Model. The polyethylene requirements assumed 100 square inches of 2-1/2 mil polyethylene per bag [66]. The dollar cost came from polyethylene film suppliers [70]. The energy was calculated from the Census of Manufactures data [21] combined with and checked against other sources [71, 72]. A final figure of 445.3 Btu/Bag was used [73].

The costs of capital were estimated by increasing DEL costs by 10% [74].

Aggregate figures were allocated to individual packages on the basis of 1.8×10^7 Bags/yr. [59, 75]. Table I lists the packaging inputs as used in this study.

(d) Wholesaling

Wholesaling costs were calculated using the same methodology as described in the section under TSP wholesaling. The price paid by wholesalers was obtained [4], to which was added a transportation cost [76]. From this total cost were calculated the dollar, energy, and labor costs of wholesaling as described in Appendix D(1)(e).

Table J summarizes the wholesaling data used.

(e) Retailing

Similarly, dollar, energy and labor costs of retailing beans were calculated in the same manner as described in III G, with the exception that there is not a large figure of unallocated "profit." This is due to the fact that the retail price was calculated on the basis of the average markups from [77] and not from actual practice.

Table K summarizes the retailing data used.

(f) Home

Transportation figures for beans are nearly non-existent; therefore, we assume that the dollar, energy and labor costs that should be allocated to beans are the same as were calculated for an equal weight of beef.

Beans require no refrigeration and hence no share of refrigerator capital or operational cost was allocated to beans.

The calculations for cooking of soybeans were done for electric and gas ranges. The figure for cooking on an electric range, based on empirical data [78], came out to 3,420.68 direct Btu/lb. energy of dry beans.

The figure for cooking on a gas range was derived partially from epirical data and involves some assumptions [81]. The figure calculated is 4,738.83 Btu/lb. dry soybeans.

The capital DEL costs of the stove were assumed to be the same as beef.

Average prices for gas and electricity [40] were used to calculate the dollar cost for cooking.

Table L summarizes the home data as used in this section of the report.

(3) Beef System

(a) Cow-Calf

The basic data for the cow-calf program was obtained from the Economic Research Service (ERS) field representatives [82]. Although this data was in rough estimate form, and only representative of

enterprises of the size and locations specified, it was used because of its detailed nature. Because each input must be matched with an input-output classification number for use with the energy coefficient matrix [83], data must be detailed enough to allow this classification. Data used was from three areas of the United States: Cornbelt region, Texas region, and Inter-mountain region. This data was given in 1974-dollars per production unit. These costs are not entirely accurate because each calf-producing cow is being maintained besides producing milk for her calf. Because the entire herd of females does not produce each year, the cost per production unit was felt to be the closest estimate to cost per calf. The 1974 costs were deflated to 1973 as discussed in Appendix A. Energy costs were given in dollars and converted to Btu's by using an average price for that type of energy. Labor Costs in dollars were converted to jobs by using an average wage for that type of labor. The input data for the three systems appear in tables M1, M2, and M3.

(b) Feedlot

Data for the costs of feeding out cattle was also obtained from the ERS [13]. Data for the second quarter of 1973 was selected because no average for the year was available. Each of three different feedlot regions was matched with the cow-calf program close to it: Cornbelt feedlot matched with the Cornbelt cow-calf program; Texas Panhandle feedlot with the Texas cow-calf program, and California feedlot with the Inter-mountain cow-calf program. Aggregation was a major problem here, solved only with the help of Dr. Van Arsdale and Dr. Boykin [84]. Another problem was that the weight at which the

calf was weaned in the particular cow-calf program did not match the weight at which the feedlot data was applicable in the Cornbelt and Texas Panhandle systems. To adjust for this, the feed costs were increased at the feedlot level to add the extra weight according to the cost per hundred weight gain given in the ERS tables. Overhead was not increased. The feedlot input data appear in Tables N1, N2, and N3. The beef cow is assumed to be sold at a weight of 1,000 lbs.

(c) Meat Packing and Processing

At this point in our system, an adjustment had to be made to account for the fact that more than one product comes from a beef cow. At the end of the feedlot system, the cost per head of cattle is known. Some of that cost should be allocated to the by-products from the cow and the rest to the retail cuts of meat produced. For each head, this by-product cost was allocated using a $.101/retail lb. by-product adjustment figure [56].

The data for meat packing and processing was obtained from ERS [56]. The energy cost had to be disaggregated into the different kinds of energy used. The cost was allocated on a percentage basis using the 1967 Census of Manufactures dollars spent on energy figures for industry 2011, with an adjustment for the different rates of inflation for each energy type. Btu figures were obtained from the dollar costs by using an average price for each energy type. Packing and Processing input data appear in Tables 01, 02, and 03.

(d) Wholesaling

The Economic Research Service of the United States Department of Agriculture provided a wholesaling margin for beef but the margin was almost entirely unallocated. The percentage breakdown of the wholesale margins given in Progressive Grocer [55] was used to allocate this figure. This also left an aggregated energy cost but without a Census of Manufacturers breakdown of energy, unlike the Packing and Processing system. The BEA's I/O data [9] provides the total dollar transactions between each of the 358 sectors of the economy, and so the total dollars from each energy sector to the wholesaling sector were known. Each energy sector's total dollars to wholesaling was divided by the total dollars flowing from all energy sectors to give a percentage breakdown of the energy cost figure. For example, let $DDT_{i,j}$ be the direct dollar transaction from sector i to sector j. If the energy sectors are sectors 1 thru 5 and the wholesaling sector is 330, and INF_i is an inflator for the energy costs from 1967 to 1973 for energy type i, then the dollar cost of energy type i is

$$\frac{DDT_{i,330} \times INF_i}{\sum_{k=1}^{5} DDT_{k,330} \times INF_k} \times \$NRG$$

where \$NRG is the total energy cost in the wholesaling margin. The Wholesaling input data appear in Tables P1, P2, and P3.

(e) Retailing

The Retailing data was from the same ERS publication as the Packing and Processing data and the Wholesale margin. The energy figure was the only input which had to be disaggregated. The method used in Wholesaling to allocate that energy figure was also used here, with the retailing sector inserted for the wholesaling one. The Retailing input data appear in Tables Q1, Q2, and Q3.

(f) Home

The final step in the system, home preservation and preparation, consists basically of three inputs: transportation from the retailer to the home, storage, and cooking. Other inputs, such as dish-washing, space heating, and lighting were felt to be minor and were ignored.

Transportation energy was first calcuated for food shopping, and then a portion was allocated to beef as explained below. Figures for average shopping trip distances were obtained [85] and the DEL costs were calculated [86] for an average household [11] for one year. The difficulty arises when one attempts to allocate a portion of the total costs of food shopping to beef. It was decided to allocate these costs on a weight basis. The USDA's market basket [87] of goods was used as a base. This market basket was updated to 1973 using per capita consumption tables [88] after having been first converted to a weight basis [89]. Table AA lists the revised composition of the market basket as used in this study. On a pound basis, beef represented 6.08 percent of all goods purchased, and therefore

6.08 percent of the total transportation DEL costs calculated above, was allocated to beef. This figure was then divided by total beef consumption per household [11, 13] to get the DEL costs per pound of beef.

Refrigeration energy was calculated using a similar allocation scheme, apportioning the DEL costs to meat on a weight basis by dividing total pounds of meat by total pounds of refrigerated groceries [90]. This scheme is admittedly arbitrary and ignores such considerations as differing amounts of actual refrigeration time. However, we are limited by the scope of this study; also this method was felt to be superior to the other allocation scheme readily available, namely on a dollar basis. Total energy figures for refrigeration are from [91]. Average electricity prices were used to obtain dollar costs, which were used to obtain labor costs. The saturation level of refrigerators is 99.9 percent; hence these figures apply to virtually all households.

The capital DEL costs of the refrigerator, that is, the DEL required to make the refrigerator, was determined by converting the purchase price [92] to energy and labor costs (as described elsewhere in this report), allocating this over an average lifetime [93] and then allocating to beef on a weight basis as described above.

The treatment of freezers is analogous. Operational energy [91] was allocated on the basis of home freezer use devoted to beef [94]. Average prices were again used to obtain dollar and labor costs as described above. Capital DEL costs were determined from the purchase price [92], spread over an average freezer lifetime [93], and allocated

according to freezer use [94]. However, this figure was adjusted to reflect the saturation level of freezers, 34 percent [92].

The last area evaluated was the DEL costs associated with preparation. Calculations were made for both gas and electric ranges, and then allocated according to product saturation levels [92, 95].

Total DEL costs of gas and electric ranges were calculated from purchase price and average lifetime figures, as described above for refrigerators and freezers. The capital DEL cost allocations presented a problem, and were allocated as follows: a figure for the operational energy associated with the cooking of one pound of beef on an electric range was developed (as explained below). This figure, 2614 Btu/pound, was multiplied by the average amount of beef per household per year [11, 91] to get the total energy associated with the cooking of beef. This was then divided by the total amount of energy used by an average electric range in a year [91] with the resultant percentage being used as the allocation factor for DEL costs for both electric and gas ranges. The allocation factor thus derived was 15.9 percent.

Separate numbers were used for the cooking energies for gas and electric ranges. The number for gas ranges represents the only data which could be obtained which was based on empirical research. It represents the energy necessary to cook one pound of beef in the form of four ground beef patties [96]. The number for electric ranges is also based on empirical research [97] and represents the amount of electricity used to cook one pound of beef in the form of a meatloaf.

The numbers are surprisingly close. The home input data appear in Tables R1, R2, and R3.

APPENDIX E.

DETAILED RESULTS

This appendix contains detailed results for all of the systems. Each system is broken down into its subsystems which list the individual input names and the calculated dollar, energy, and labor costs associated with those individual inputs. The results are normalized to a per retail pound basis, and are not on a protein basis. The energy costs are further broken down into the five energy categories. (Note that these are not cumulative; rather, they represent energy flows.)

BEAN

DATA#	NAME	1973 $/LB	BTUS/LB	MAN-YRS/LB	COAL	CRUDE	REFINED	ELECT	GAS
	FARM								
1	FERTILIZER	0.389E-02	0.611E 03	0.281E-06	0.146E 03	0.431E 03	0.858E 02	0.532E 02	0.334E 03
2	SEED	0.345E-02	0.911E 02	0.176E-06	0.110E 02	0.778E 02	0.577E 02	0.378E 01	0.180E 02
3	HERBICIDES	0.389E-02	0.695E 03	0.282E-06	0.169E 03	0.495E 03	0.168E 03	0.513E 02	0.311E 03
4	MACH REPAIR	0.273E-02	0.102E 03	0.305E-06	0.197E 02	0.790E 02	0.499E 02	0.577E 01	0.269E 02
5	LABOR	0.777E-02	0.000E 00	0.164E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
6	DEPRECIATION	0.130E-02	0.520E 02	0.118E-06	0.175E 02	0.323E 02	0.149E 02	0.362E 01	0.164E 02
7	MACH DEP	0.561E-02	0.241E 03	0.548E-06	0.810E 02	0.150E 03	0.692E 02	0.168E 02	0.762E 02
8	TAXES	0.518E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
9	INTEREST	0.233E-01	0.975E 03	0.346E-05	0.260E 03	0.650E 03	0.257E 03	0.106E 03	0.375E 03
10	DISEL FUEL	0.117E-02	0.890E 03	0.332E-07	0.108E 02	0.877E 03	0.793E 03	0.420E 01	0.627E 02
11	ELECT	0.432E-03	0.262E 03	0.203E-07	0.133E 03	0.814E 02	0.215E 02	0.764E 02	0.578E 02
12	GASOLINE	0.777E-03	0.359E 03	0.134E-07	0.436E 01	0.354E 03	0.320E 03	0.170E 01	0.245E 02
13	AUTO GAS	0.299E-03	0.138E 03	0.515E-08	0.168E 01	0.136E 03	0.123E 03	0.652E 00	0.941E 01
14	AUTO OH	0.100E-03	0.510E 01	0.633E-08	0.224E 01	0.261E 01	0.867E 00	0.424E 00	0.166E 01
15	DISEL FUEL--MH	0.518E-04	0.393E 02	0.147E-08	0.477E 00	0.387E 02	0.350E 02	0.185E 00	0.268E 01
16	LABOR--MH	0.155E-03	0.000E 00	0.328E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
17	REPAIRS--MH	0.311E-03	0.116E 02	0.348E-07	0.224E 01	0.900E 01	0.568E 01	0.657E 00	0.307E 01
18	MISC	0.133E-02	0.674E 02	0.105E-06	0.129E 02	0.514E 02	0.302E 02	0.490E 01	0.198E 02
19	PROFIT	0.349E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
20	TRANS TO ELEV	0.881E-03	0.315E 02	0.924E-07	0.291E 01	0.282E 02	0.230E 02	0.700E 00	0.444E 01
	GRAIN HANDLING & STORAGE								
21	DEPRECIATION	0.880E-03	0.432E 02	0.984E-07	0.145E 02	0.268E 02	0.124E 02	0.301E 01	0.137E 02
22	INSURANCE	0.220E-03	0.342E 01	0.181E-07	0.628E 00	0.266E 01	0.159E 01	0.224E 00	0.990E 00
23	TAXES	0.250E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
24	LICENSES & BONDS	0.268E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
25	INTEREST	0.109E-02	0.455E 02	0.161E-06	0.121E 02	0.303E 02	0.120E 02	0.495E 01	0.175E 02
26	LABOR	0.508E-03	0.000E 00	0.107E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
27	ADMIN. OH	0.363E-03	0.769E 01	0.333E-07	0.182E 01	0.555E 01	0.261E 01	0.506E 00	0.278E 01
28	TRUCK EXPENSE	0.466E-04	0.182E 01	0.402E-08	0.163E 00	0.163E 01	0.133E 01	0.495E-01	0.257E 00
29	BUILDING REPAIRS	0.102E-03	0.389E 01	0.487E-08	0.832E 00	0.295E 01	0.190E 01	0.172E 00	0.977E 00
30	EQUIP REPAIRS	0.656E-04	0.127E 01	0.548E-08	0.300E 00	0.916E 00	0.431E 00	0.834E-01	0.459E 00
31	FUMIGATION	0.259E-04	0.497E 00	0.215E-08	0.118E 00	0.359E 00	0.169E 00	0.327E-01	0.180E 00
32	ELECT	0.484E-04	0.293E 02	0.228E-08	0.149E 02	0.912E 01	0.240E 01	0.856E 01	0.648E 01
33	MISC	0.128E-03	0.332E 01	0.106E-07	0.111E 01	0.195E 01	0.847E 00	0.428E 00	0.105E 01
34	TRANS TO PACK	0.518E-02	0.202E 03	0.446E-06	0.187E 02	0.181E 03	0.148E 03	0.449E 01	0.285E 02
	PACKAGING								
35	HEATING-OIL	0.121E-04	0.918E 01	0.343E-09	0.112E 00	0.904E 01	0.819E 01	0.434E-01	0.626E 00
36	HEATING-GAS	0.369E-05	0.836E 01	0.258E-09	0.455E-01	0.831E 01	0.381E-01	0.151E-01	0.806E 01
37	LIGHTING	0.213E-03	0.129E 03	0.100E-07	0.659E 02	0.402E 02	0.106E 02	0.378E 02	0.286E 02
38	MACHINARY-ELECT	0.874E-04	0.530E 02	0.411E-08	0.270E 02	0.165E 02	0.435E 01	0.155E 02	0.117E 02
39	MATERIALS-POLY	0.205E-02	0.507E 03	0.184E-06	0.135E 03	0.349E 03	0.122E 03	0.377E 02	0.217E 03
40	DEPRECIATION	0.107E-02	0.427E 02	0.971E-07	0.143E 02	0.265E 02	0.122E 02	0.297E 01	0.135E 02
41	SHIPPING CARTON	0.330E-02	0.324E 03	0.264E-06	0.982E 02	0.214E 03	0.882E 02	0.183E 02	0.118E 03
42	LABOR	0.100E 00	0.000E 00	0.125E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
43	RESID PROFIT	0.775E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
44	TRANS TO WHOLS	0.340E-01	0.133E 04	0.293E-05	0.123E 03	0.119E 04	0.969E 03	0.295E 02	0.187E 03
	WHOLESALING								
45	LABOR	0.135E-01	0.000E 00	0.174E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
46	DEP	0.120E-02	0.480E 02	0.109E-06	0.161E 02	0.298E 02	0.138E 02	0.335E 01	0.152E 02
47	RENT	0.100E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
48	EQUIP COSTS	0.140E-02	0.578E 02	0.101E-06	0.244E 02	0.307E 02	0.108E 02	0.436E 01	0.190E 02
49	INTEREST	0.900E-03	0.499E 02	0.177E-06	0.133E 02	0.332E 02	0.132E 02	0.543E 01	0.192E 02
50	ADVERTISING	0.300E-03	0.776E 01	0.185E-07	0.235E 01	0.501E 01	0.219E 01	0.648E 00	0.265E 01

51	INSURANCE	0.50[illegible]E-03	0.735E 01	0.389E-07	0.135E 01	0.570E 01	0.342E 01	0.482E 00	0.213E 01
52	OTHER	0.390E-02	0.803E 02	0.348E-06	0.190E 02	0.580E 02	0.273E 02	0.529E 01	0.291E 02
53	COAL	0.489E-05	0.161E 02	0.258E-09	0.160E 02	0.652E-01	0.367E-01	0.651E-02	0.255E-01
54	REFINED	0.281E-03	0.213E 03	0.796E-08	0.259E 01	0.210E 03	0.190E 03	0.101E 01	0.145E 02
55	ELECT	0.278E-03	0.169E 03	0.131E-07	0.859E 02	0.524E 02	0.138E 02	0.492E 02	0.372E 02
56	GAS	0.363E-04	0.433E 02	0.133E-08	0.235E 00	0.430E 02	0.197E 00	0.782E-01	0.418E 02
57	TRANS TO RETAIL	0.540E-02	0.211E 03	0.465E-06	0.195E 02	0.189E 03	0.154E 03	0.468E 01	0.297E 02
	RETAILING								
58	LABOR	0.338E-01	0.000E 00	0.517E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
59	PACKAGING	0.213E-02	0.212E 03	0.173E-06	0.642E 02	0.140E 03	0.577E 02	0.120E 02	0.771E 02
60	REPAIRS	0.112E-02	0.253E 02	0.110E-06	0.599E 01	0.183E 02	0.861E 01	0.167E 01	0.917E 01
61	DEP	0.166E-02	0.665E 02	0.151E-06	0.223E 02	0.413E 02	0.191E 02	0.463E 01	0.210E 02
62	BUSINESS TAXES	0.238E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
63	RENT	0.695E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
64	INTEREST	0.650E-03	0.360E 02	0.128E-06	0.960E 01	0.240E 02	0.951E 01	0.392E 01	0.138E 02
65	ADVERTISING	0.659E-02	0.171E 03	0.406E-06	0.517E 02	0.110E 03	0.480E 02	0.142E 02	0.582E 02
66	OTHER	0.674E-02	0.139E 03	0.601E-06	0.329E 02	0.100E 03	0.472E 02	0.914E 01	0.503E 02
67	PROFIT	0.429E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
68	ELECT	0.837E-03	0.508E 03	0.394E-07	0.259E 03	0.158E 03	0.416E 02	0.148E 03	0.112E 03
69	REFINED	0.373E-03	0.283E 03	0.106E-07	0.344E 01	0.279E 03	0.252E 03	0.134E 01	0.193E 02
70	GAS	0.201E-03	0.240E 03	0.739E-08	0.130E 01	0.238E 03	0.109E 01	0.433E 00	0.231E 03
	HOME								
71	TRANS.	0.810E-02	0.124E 04	0.942E-06	0.156E 03	0.104E 04	0.834E 03	0.678E 02	0.178E 03
72	GAS STOVE-DIR	0.303E-02	0.275E 04	0.847E-07	0.150E 02	0.273E 04	0.125E 02	0.496E 01	0.265E 04
73	GAS STOVE-CAP	0.181E-02	0.134E 03	0.179E-06	0.563E 02	0.714E 02	0.223E 02	0.999E 01	0.467E 02
74	ELECT STOVE-DIR	0.220E-01	0.694E 04	0.539E-06	0.354E 04	0.216E 04	0.569E 03	0.203E 04	0.153E 04
75	ELECT STOVE-CAP	0.224E-02	0.165E 03	0.221E-06	0.696E 02	0.882E 02	0.275E 02	0.123E 02	0.577E 02

	COST MARGIN $/LB	TOTAL COST $/LB	NRG MARGIN BTUS	TOTAL NRG BTUS	JOBS MARGIN MAN-YRS/LB	TOTAL JOBS MAN-YRS/LB
FARM	0.975837E-01	0.975837E-01	0.457041E 04	0.457041E 04	0.715508E-05	0.715508E-05
GRAIN HANDLING & STO	0.893229E-02	0.106516E 00	0.342284E 03	0.491269E 04	0.893744E-06	0.804882E-05
PACKAGING	0.218237E 00	0.324753E 00	0.240138E 04	0.731407E 04	0.159874E-04	0.240362E-04
WHOLESALING	0.287002E-01	0.353453E 00	0.903235E 03	0.821730E 04	0.302020E-05	0.270564E-04
RETAILING	0.668508E-01	0.420303E 00	0.167919E 04	0.989650E 04	0.679845E-05	0.338549E-04
HOME	0.371800E-01	0.457483E 00	0.112284E 05	0.211249E 05	0.196503E-05	0.358199E-04

UNITEX

DATA#	NAME	1973 $/LB	BTUS/LB	MAN-YRS/LB	COAL	CRUDE	REFINED	ELECT	GAS
	FARM								
1	FERTILIZER	0.315E-02	0.648E 03	0.228E-06	0.155E 03	0.458E 03	0.910E 02	0.565E 02	0.354E 03
2	SEED	0.280E-02	0.966E 02	0.142E-06	0.116E 02	0.825E 02	0.612E 02	0.401E 01	0.190E 02
3	HERBICIDES	0.315E-02	0.737E 03	0.228E-06	0.179E 03	0.525E 03	0.179E 03	0.545E 02	0.330E 03
4	MACH REPAIR	0.221E-02	0.108E 03	0.248E-06	0.298E 02	0.838E 02	0.529E 02	0.612E 01	0.286E 02
5	LABOR	0.630E-02	0.000E 00	0.133E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
6	DEPRECIATION	0.105E-02	0.551E 02	0.959E-07	0.195E 02	0.342E 02	0.158E 02	0.384E 01	0.174E 02
7	MACH DEP	0.455E-02	0.256E 03	0.445E-06	0.859E 02	0.159E 03	0.734E 02	0.178E 02	0.808E 02
8	TAXES	0.420E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
9	INTEREST	0.189E-01	0.103E 04	0.281E-05	0.276E 03	0.689E 03	0.273E 03	0.113E 03	0.397E 03
10	DISEL FUEL	0.952E-03	0.944E 03	0.270E-07	0.115E 02	0.930E 03	0.842E 03	0.446E 01	0.644E 02
11	ELECT	0.350E-03	0.278E 03	0.165E-07	0.142E 03	0.863E 02	0.228E 02	0.811E 02	0.614E 02
12	GASOLINE	0.630E-03	0.381E 03	0.109E-07	0.463E 01	0.375E 03	0.339E 03	0.180E 01	0.260E 02
13	AUTO GAS	0.242E-03	0.146E 03	0.418E-08	0.178E 01	0.144E 03	0.130E 03	0.691E 00	0.998E 01
14	AUTO OH	0.812E-04	0.541E 01	0.513E-08	0.237E 01	0.276E 01	0.920E 00	0.450E 00	0.176E 01
15	DISEL FUEL--MH	0.420E-04	0.416E 02	0.119E-08	0.506E 00	0.410E 02	0.371E 02	0.197E 00	0.284E 01
16	LABOR--MH	0.126E-03	0.000E 00	0.266E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
17	REPAIRS--MH	0.252E-03	0.124E 02	0.282E-07	0.237E 01	0.955E 01	0.603E 01	0.697E 00	0.325E 01
18	MISC	0.108E-02	0.715E 02	0.850E-07	0.137E 02	0.546E 02	0.320E 02	0.520E 01	0.210E 02
19	PROFIT	0.283E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
20	TRANS TO ELEV	0.714E-03	0.334E 02	0.749E-07	0.309E 01	0.299E 02	0.244E 02	0.742E 00	0.471E 01
	GRAIN HANDLING & STORAGE								
21	DEPRECIATION	0.714E-03	0.459E 02	0.798E-07	0.154E 02	0.285E 02	0.132E 02	0.320E 01	0.145E 02
22	INSURANCE	0.178E-03	0.363E 01	0.147E-07	0.666E 00	0.282E 01	0.169E 01	0.238E 00	0.105E 01
23	TAXES	0.203E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
24	LICENSES & BONDS	0.217E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
25	INTEREST	0.882E-03	0.482E 02	0.131E-06	0.128E 02	0.321E 02	0.127E 02	0.525E 01	0.185E 02
26	LABOR	0.412E-03	0.000E 00	0.869E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
27	ADMIN. OH	0.294E-03	0.815E 01	0.270E-07	0.193E 01	0.589E 01	0.277E 01	0.537E 00	0.295E 01
28	TRUCK EXPENSE	0.378E-04	0.193E 01	0.326E-08	0.179E 00	0.173E 01	0.141E 01	0.429E-01	0.272E 00
29	BUILDING REPAIRS	0.826E-04	0.413E 01	0.395E-08	0.883E 00	0.313E 01	0.201E 01	0.183E 00	0.104E 01
30	EQUIP REPAIRS	0.532E-04	0.134E 01	0.445E-08	0.319E 00	0.971E 00	0.457E 00	0.885E-01	0.487E 00
31	FUMIGATION	0.210E-04	0.527E 00	0.174E-08	0.125E 00	0.381E 00	0.179E 00	0.347E-01	0.191E 00
32	ELECT	0.392E-04	0.311E 02	0.185E-08	0.158E 02	0.967E 01	0.255E 01	0.908E 01	0.687E 01
33	MISC	0.104E-03	0.353E 01	0.862E-08	0.117E 01	0.207E 01	0.899E 00	0.454E 00	0.112E 01
34	TRANS TO EXT	0.420E-02	0.215E 03	0.362E-06	0.198E 02	0.192E 03	0.157E 03	0.477E 01	0.302E 02
	OIL EXTRACTION								
35	LABOR	0.482E-03	0.000E 00	0.629E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
36	SUPPLIES	0.756E-04	0.936E 01	0.536E-08	0.260E 01	0.633E 01	0.171E 01	0.701E 00	0.438E 01
37	HEXANE	0.101E-03	0.864E 02	0.247E-08	0.105E 01	0.851E 02	0.770E 02	0.408E 00	0.589E 01
38	REPAIRS	0.443E-03	0.254E 02	0.393E-07	0.104E 02	0.135E 02	0.427E 01	0.242E 01	0.882E 01
39	DEPRECIATION	0.266E-03	0.139E 02	0.242E-07	0.468E 01	0.865E 01	0.400E 01	0.971E 00	0.440E 01
40	INSURANCE	0.196E-04	0.401E 00	0.162E-08	0.735E-01	0.311E 00	0.186E 00	0.263E-01	0.116E 00
41	TAXES	0.108E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
42	MILL SUPERVISION	0.220E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
43	ADMIN OH	0.401E-03	0.118E 02	0.390E-07	0.279E 01	0.853E 01	0.401E 01	0.776E 00	0.427E 01
44	SALARIES	0.155E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
45	INTEREST	0.289E-03	0.209E 02	0.568E-07	0.558E 01	0.139E 02	0.552E 01	0.228E 01	0.804E 01
46	NATURAL GAS	0.472E-03	0.854E 03	0.201E-07	0.465E 01	0.849E 03	0.389E 01	0.154E 01	0.824E 03
47	ELECT	0.240E-03	0.385E 03	0.229E-07	0.196E 03	0.120E 03	0.316E 02	0.112E 03	0.851E 02
48	FUEL OIL	0.109E-03	0.108E 03	0.309E-08	0.132E 01	0.107E 03	0.965E 02	0.512E 00	0.738E 01
49	PROPANE	0.625E-05	0.103E 02	0.293E-09	0.125E 00	0.101E 02	0.915E 01	0.485E-01	0.700E 00
	MILLING								
50	DEP. ON EQUIP.	0.533E-03	0.271E 02	0.616E-07	0.910E 01	0.168E 02	0.777E 01	0.189E 01	0.856E 01
51	LABOR	0.106E-02	0.000E 00	0.139E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
52	ELECT	0.604E-03	0.366E 03	0.284E-07	0.186E 03	0.114E 03	0.300E 02	0.107E 03	0.809E 02
53	MAINT.	0.108E-02	0.247E 02	0.107E-06	0.585E 01	0.179E 02	0.840E 01	0.163E 01	0.895E 01
54	UNALL-PROFIT	0.921E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	UNITEX								
55	EQUIP DEP	0.159E-01	0.808E 03	0.184E-05	0.272E 03	0.502E 03	0.232E 03	0.563E 02	0.256E 03
56	EQUIP MAINT	0.610E-03	0.139E 02	0.603E-07	0.330E 01	0.101E 02	0.474E 01	0.918E 00	0.505E 01
57	INTEREST	0.225E-02	0.125E 03	0.443E-06	0.333E 02	0.833E 02	0.330E 02	0.136E 02	0.430E 02
58	BUILDING DEP	0.329E-02	0.132E 03	0.299E-06	0.442E 02	0.817E 02	0.378E 02	0.917E 01	0.416E 02
59	INSURANCE	0.516E-03	0.807E 01	0.427E-07	0.148E 01	0.626E 01	0.375E 01	0.529E 00	0.234E 01
60	WATER	0.282E-03	0.251E 02	0.192E-07	0.567E 01	0.185E 02	0.420E 01	0.160E 01	0.138E 02
61	PACK-50LB BAGS	0.413E-02	0.372E 03	0.347E-06	0.117E 03	0.238E 03	0.100E 03	0.267E 02	0.129E 03
62	FLAVORING	0.648E-02	0.231E 03	0.301E-06	0.579E 02	0.165E 03	0.629E 02	0.119E 02	0.969E 02
63	LABOR	0.200E-01	0.000E 00	0.261E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
64	BUILD. MAINT	0.305E-02	0.102E 03	0.172E-06	0.234E 02	0.749E 02	0.421E 02	0.587E 01	0.306E 02

65	GAS	0.141E-03	0.319E 03	0.983E-08	0.174E 01	0.317E 03	0.145E 01	0.576E 00	0.308E 03
66	ELECT	0.403E-02	0.244E 04	0.190E-06	0.124E 04	0.759E 03	0.200E 03	0.713E 03	0.540E 03
67	OIL	0.155E-03	0.117E 03	0.438E-08	0.142E 01	0.115E 03	0.104E 03	0.554E 00	0.799E 01
68	STEAM-GAS	0.146E-03	0.331E 03	0.102E-07	0.180E 01	0.329E 03	0.151E 01	0.598E 00	0.320E 03
69	STEAM-OIL	0.192E-02	0.145E 04	0.543E-07	0.177E 02	0.143E 04	0.130E 04	0.687E 01	0.992E 02
70	PROFIT	0.258E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	PACKAGING								
71	TRANS TO PACK	0.340E-01	0.133E 04	0.293E-05	0.123E 03	0.119E 04	0.969E 03	0.295E 02	0.187E 03
72	PAPER	0.300E-01	0.265E 04	0.216E-05	0.917E 03	0.162E 04	0.701E 03	0.195E 03	0.872E 03
73	ALUMINUM	0.324E-02	0.654E 03	0.221E-06	0.241E 03	0.338E 03	0.622E 02	0.121E 03	0.267E 03
74	ASSEMBLY	0.000E 00	0.361E 04	0.303E-05	0.125E 04	0.220E 04	0.953E 03	0.265E 03	0.119E 04
75	SHIPPING CASE	0.893E-02	0.876E 03	0.716E-06	0.266E 03	0.580E 03	0.239E 03	0.496E 02	0.319E 03
76	TRANS TO WHSLER	0.340E-01	0.133E 04	0.293E-05	0.123E 03	0.119E 04	0.969E 03	0.295E 02	0.187E 03
77	PROFIT	0.732E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	WHOLESALING								
78	LABOR	0.178E-01	0.000E 00	0.229E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
79	DEPRECIATION	0.160E-02	0.641E 02	0.146E-06	0.215E 02	0.398E 02	0.184E 02	0.446E 01	0.202E 02
80	RENT	0.140E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
81	EQUIP.COSTS	0.180E-02	0.743E 02	0.130E-06	0.314E 02	0.394E 02	0.139E 02	0.560E 01	0.244E 02
82	INTEREST	0.120E-02	0.665E 02	0.236E-06	0.177E 02	0.443E 02	0.176E 02	0.724E 01	0.256E 02
83	ADVERTISING	0.300E-03	0.776E 01	0.185E-07	0.235E 01	0.501E 01	0.219E 01	0.648E 00	0.265E 01
84	INSURANCE	0.700E-03	0.103E 02	0.544E-07	0.189E 01	0.799E 01	0.478E 01	0.674E 00	0.298E 01
85	OTHER	0.520E-02	0.107E 03	0.463E-06	0.254E 02	0.774E 02	0.364E 02	0.705E 01	0.338E 02
86	COAL	0.570E-05	0.188E 02	0.300E-09	0.187E 02	0.760E-01	0.427E-01	0.759E-02	0.297E-01
87	REFINED	0.328E-03	0.249E 03	0.929E-08	0.302E 01	0.245E 03	0.222E 03	0.118E 01	0.170E 02
88	ELECT	0.324E-03	0.196E 03	0.152E-07	0.100E 03	0.611E 02	0.161E 02	0.573E 02	0.434E 02
89	GAS	0.423E-04	0.505E 02	0.155E-08	0.274E 00	0.501E 02	0.230E 00	0.911E-01	0.487E 02
90	PROFIT	0.174E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
91	TRANS TO RETAIL	0.540E-02	0.211E 03	0.465E-06	0.195E 02	0.189E 03	0.154E 03	0.468E 01	0.297E 02
	RETAILING								
92	LABOR	0.448E-01	0.000E 00	0.685E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
93	PACKAGING	0.280E-02	0.278E 03	0.227E-06	0.844E 02	0.184E 03	0.758E 02	0.158E 02	0.101E 03
94	REPAIRS	0.150E-02	0.286E 02	0.124E-06	0.676E 01	0.206E 02	0.971E 01	0.188E 01	0.103E 02
95	DEPRECIATION	0.220E-02	0.881E 02	0.200E-06	0.295E 02	0.547E 02	0.253E 02	0.614E 01	0.278E 02
96	TAXES	0.310E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
97	RENT	0.800E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
98	INTEREST	0.180E-02	0.998E 02	0.354E-06	0.266E 02	0.665E 02	0.263E 02	0.109E 02	0.383E 02
99	ADVERTISING	0.870E-02	0.225E 03	0.536E-06	0.682E 02	0.145E 03	0.634E 02	0.188E 02	0.769E 02
100	OTHER	0.890E-02	0.183E 03	0.793E-06	0.434E 02	0.132E 03	0.623E 02	0.121E 02	0.664E 02
101	PROFIT	0.973E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
102	REFINED	0.502E-03	0.381E 03	0.142E-07	0.463E 01	0.375E 03	0.340E 03	0.180E 01	0.260E 02
103	ELECT	0.113E-02	0.685E 03	0.532E-07	0.349E 03	0.213E 03	0.562E 02	0.200E 03	0.151E 03
104	GAS	0.270E-03	0.322E 03	0.992E-08	0.175E 01	0.320E 03	0.147E 01	0.581E 00	0.311E 03
	HOME PREPARATION								
105	TRANS.	0.810E-02	0.124E 04	0.942E-06	0.156E 03	0.104E 04	0.834E 03	0.678E 02	0.178E 03
106	GAS STOVE-DIR	0.189E-02	0.171E 04	0.528E-07	0.932E 01	0.170E 04	0.780E 01	0.309E 01	0.165E 04
107	GAS STOVE-CAP	0.371E-02	0.274E 03	0.366E-06	0.115E 03	0.146E 03	0.456E 02	0.205E 02	0.957E 02
108	ELECT STOVE-DIR	0.874E-02	0.530E 04	0.411E-06	0.270E 04	0.165E 04	0.435E 03	0.155E 04	0.117E 04
109	ELECT STOVE-CAP	0.459E-02	0.339E 03	0.452E-06	0.143E 03	0.181E 03	0.564E 02	0.253E 02	0.118E 03

	COST MARGIN $/LB	TOTAL COST $/LB	NRG MARGIN BTUS	TOTAL NRG BTUS	JOBS MARGIN MAN-YRS/LB	TOTAL JOBS MAN-YRS/LB
FARM	0.791394E-01	0.791394E-01	0.484822E 04	0.484822E 04	0.580269E-05	0.580269E-05
GRAIN HANDLING & STO	0.724400E-02	0.863833E-01	0.363090E 03	0.521131E 04	0.724817E-06	0.652751E-0
OIL EXTRACTION	0.338607E-02	0.897694E-01	0.152660E 04	0.673791E 04	0.278105E-06	0.680561E-05
MILLING	0.953656E-01	0.185135E 00	0.417938E 03	0.715584E 04	0.335683E-06	0.714130E-05
UNITEX	0.887298E-01	0.273865E 00	0.648246E 04	0.136383E 05	0.640387E-05	0.135452E-04
PACKAGING	0.183370E 00	0.457235E 00	0.104565E 05	0.240948E 05	0.119837E-04	0.255288E-04
WHOLESALING	0.378400E-01	0.495075E 00	0.105542E 04	0.251502E 05	0.383376E-05	0.293626E-04
RETAILING	0.181002E 00	0.676076E 00	0.229133E 04	0.274415E 05	0.916174E-05	0.385243E-0
HOME PREPARATION	0.270240E-01	0.703100E 00	0.886720E 04	0.363087E 05	0.222486E-05	0.407492E-04

DATA#	NAME	1971 $/LB	BTU/LB	MAN-YRS/LB	COAL	CRUDE	REFINED	ELECT	GAS
	FARM								
1	FERTILIZER	0.315E-02	0.648E 03	0.228E-06	0.155E 03	0.458E 03	0.910E 02	0.565E 02	0.354E 03
2	SEED	0.280E-02	0.966E 02	0.142E-06	0.116E 02	0.825E 02	0.612E 02	0.401E 01	0.190E 02
3	HERBICIDES	0.315E-02	0.737E 03	0.228E-06	0.179E 03	0.525E 03	0.179E 03	0.545E 02	0.330E 03
4	MACH REPAIR	0.221E-02	0.108E 03	0.248E-06	0.238E 02	0.338E 02	0.529E 02	0.612E 01	0.286E 02
5	LABOR	0.630E-02	0.000E 00	0.133E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
6	DEPRECIATION	0.105E-02	0.551E 02	0.959E-07	0.135E 02	0.342E 02	0.158E 02	0.334E 01	0.174E 02
7	MACH DEP	0.455E-02	0.256E 03	0.445E-06	0.859E 02	0.159E 03	0.734E 02	0.178E 02	0.508E 02
8	TAXES	0.420E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
9	INTEREST	0.189E-01	0.103E 04	0.281E-05	0.276E 03	0.689E 03	0.273E 03	0.113E 03	0.397E 03
10	ELECT	0.350E-03	0.278E 03	0.165E-07	0.142E 03	0.863E 02	0.228E 02	0.811E 02	0.614E 02
11	DISEL FUEL	0.952E-03	0.944E 03	0.270E-07	0.115E 02	0.930E 03	0.842E 03	0.446E 01	0.644E 02
12	GASOLINE	0.630E-03	0.381E 03	0.109E-07	0.463E 01	0.375E 03	0.339E 03	0.180E 01	0.260E 02
13	AUTO GAS	0.242E-03	0.146E 03	0.418E-08	0.178E 01	0.144E 03	0.130E 03	0.691E 00	0.998E 01
14	AUTO OH	0.812E-04	0.541E 01	0.513E-08	0.237E 01	0.276E 01	0.920E 00	0.450E 00	0.176E 01
15	DISEL FUEL--MH	0.420E-04	0.416E 02	0.119E-08	0.506E 00	0.410E 02	0.371E 02	0.197E 00	0.284E 01
16	LABOR--MH	0.126E-03	0.000E 00	0.266E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
17	REPAIRS--MH	0.252E-03	0.124E 02	0.282E-07	0.237E 01	0.955E 01	0.603E 01	0.697E 00	0.325E 01
18	MISC	0.108E-02	0.715E 02	0.850E-07	0.137E 02	0.546E 02	0.320E 02	0.520E 01	0.210E 02
19	PROFIT	0.283E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
20	TRANS TO ELEV	0.714E-03	0.334E 02	0.749E-07	0.309E 01	0.299E 02	0.244E 02	0.742E 00	0.471E 01
	GRAIN HANDLING & STORAGE								
21	DEPRECIATION	0.714E-03	0.459E 02	0.798E-07	0.154E 02	0.285E 02	0.132E 02	0.320E 01	0.145E 02
22	INSURANCE	0.178E-03	0.363E 01	0.147E-07	0.666E 00	0.282E 01	0.169E 01	0.238E 00	0.105E 01
23	TAXES	0.293E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
24	LICENSES & BONDS	0.217E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
25	INTEREST	0.882E-03	0.482E 02	0.131E-06	0.128E 02	0.321E 02	0.127E 02	0.525E 01	0.185E 02
26	LABOR	0.412E-03	0.000E 00	0.869E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
27	ADMIN. OH	0.294E-03	0.815E 01	0.270E-07	0.193E 01	0.589E 01	0.277E 01	0.537E 00	0.295E 01
28	TRUCK EXPENSE	0.378E-04	0.193E 01	0.326E-08	0.179E 00	0.173E 01	0.141E 01	0.429E-01	0.272E 00
29	BUILDING REPAIRS	0.826E-04	0.413E 01	0.395E-08	0.883E 00	0.313E 01	0.201E 01	0.183E 00	0.104E 01
30	EQUIP REPAIRS	0.532E-04	0.134E 01	0.445E-08	0.318E 00	0.971E 00	0.457E 00	0.885E-01	0.487E 00
31	FUMIGATION	0.210E-04	0.527E 00	0.174E-08	0.125E 00	0.381E 00	0.179E 00	0.347E-01	0.191E 00
32	ELECT	0.372E-04	0.311E 02	0.185E-08	0.158E 02	0.967E 01	0.255E 01	0.908E 01	0.687E 01
33	MISC	0.104E-03	0.353E 01	0.862E-08	0.117E 01	0.207E 01	0.899E 00	0.454E 00	0.112E 01
34	TRANS TO PROCESS	0.420E-02	0.152E 03	0.441E-06	0.140E 02	0.136E 03	0.111E 03	0.337E 01	0.214E 02
	OIL EXTRACTION								
35	LABOR	0.482E-03	0.000E 00	0.629E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
36	SUPPLIES	0.756E-04	0.936E 01	0.536E-08	0.260E 01	0.633E 01	0.171E 01	0.701E 00	0.438E 01
37	HEXANE	0.101E-03	0.864E 02	0.247E-08	0.105E 01	0.851E 02	0.770E 02	0.408E 00	0.589E 01
38	REPAIRS	0.443E-03	0.254E 02	0.393E-07	0.104E 02	0.135E 02	0.427E 01	0.242E 01	0.882E 01
39	DEPRECIATION	0.266E-03	0.139E 02	0.242E-07	0.468E 01	0.865E 01	0.400E 01	0.971E 00	0.440E 01
40	INSURANCE	0.196E-04	0.401E 00	0.162E-08	0.735E-01	0.311E 00	0.186E 00	0.263E-01	0.116E 00
41	TAXES	0.108E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
42	MILL SUPERVISION	0.220E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
43	ADMIN OH	0.401E-03	0.118E 02	0.390E-07	0.279E 01	0.853E 01	0.401E 01	0.776E 00	0.427E 01
44	SALARIES	0.155E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
45	INTEREST	0.289E-03	0.209E 02	0.568E-07	0.558E 01	0.139E 02	0.552E 01	0.228E 01	0.804E 01
46	NATURAL GAS	0.472E-03	0.854E 03	0.201E-07	0.465E 01	0.849E 03	0.389E 01	0.154E 01	0.824E 03
47	ELECT	0.240E-03	0.385E 03	0.229E-07	0.196E 03	0.120E 03	0.316E 02	0.112E 03	0.851E 02
48	FUEL OIL	0.109E-03	0.108E 03	0.309E-08	0.132E 01	0.107E 03	0.965E 02	0.512E 00	0.738E 01
49	PROPANE	0.625E-05	0.103E 02	0.293E-09	0.125E 00	0.101E 02	0.915E 01	0.485E-01	0.700E 00
	MILLING								
50	DEP. ON EQUIP.	0.533E-03	0.271E 02	0.616E-07	0.910E 01	0.168E 02	0.777E 01	0.189E 01	0.856E 01
51	LABOR	0.106E-02	0.000E 00	0.139E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
52	ELECT	0.604E-03	0.366E 03	0.284E-07	0.186E 03	0.114E 03	0.300E 02	0.107E 03	0.809E 02
53	MAINT.	0.108E-02	0.247E 02	0.107E-06	0.585E 01	0.179E 02	0.840E 01	0.163E 01	0.895E 01
54	UNALL-PROFIT	0.921E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	TEXTURING								
55	EQUIP DEP	0.502E-02	0.255E 03	0.581E-06	0.857E 02	0.158E 03	0.732E 02	0.178E 02	0.806E 02
56	EQUIP MAINTENANCE	0.423E-03	0.965E 01	0.418E-07	0.229E 01	0.698E 01	0.328E 01	0.635E 00	0.350E 01
57	INTEREST	0.690E-03	0.383E 02	0.136E-06	0.102E 02	0.255E 02	0.101E 02	0.417E 01	0.147E 02
58	BUILDING DEP	0.127E-02	0.507E 02	0.115E-06	0.171E 02	0.315E 02	0.146E 02	0.354E 01	0.160E 02
59	INSURANCE	0.329E-03	0.514E 01	0.272E-07	0.942E 00	0.399E 01	0.239E 01	0.337E 00	0.149E 01
60	BUILD.MAINT.	0.235E-03	0.784E 01	0.133E-07	0.180E 01	0.576E 01	0.324E 01	0.452E 00	0.235E 01
61	WATER	0.939E-04	0.837E 01	0.641E-08	0.189E 01	0.615E 01	0.140E 01	0.534E 00	0.459E 01
62	PACK-50# BAGS	0.414E-02	0.373E 03	0.348E-06	0.118E 03	0.239E 03	0.101E 03	0.263E 02	0.129E 03
63	ELECT	0.226E-02	0.137E 04	0.106E-06	0.698E 03	0.426E 03	0.112E 03	0.400E 03	0.303E 03
[illegible]	FUEL OIL	[illegible]	0.106E 03	0.328E-08	0.579E 00	0.106E 03	0.485E 00	0.192E 00	0.103E 03

67	FUEL OIL-STEAM	0.254E-03	0.192E 03	0.718E-08	0.233E 01	0.189E 03	0.171E 03	0.908E 00	0.131E 02
68	LABOR	0.109E-01	0.000E 00	0.143E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
69	TRANS TO PACK	0.352E-01	0.138E 04	0.303E-05	0.127E 03	0.123E 04	0.100E 04	0.305E 02	0.194E 03
70	PROFIT	0.424E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	PACKAGING								
71	PAPER	0.300E-01	0.266E 04	0.216E-05	0.917E 03	0.162E 04	0.701E 03	0.195E 03	0.872E 03
72	ALUMINUM	0.324E-02	0.654E 03	0.221E-06	0.241E 03	0.338E 03	0.622E 02	0.121E 03	0.267E 03
73	ASSEMBLY	0.000E 00	0.361E 04	0.303E-05	0.125E 04	0.220E 04	0.953E 03	0.265E 03	0.119E 04
74	SHIPPING CASE	0.893E-02	0.876E 03	0.716E-06	0.266E 03	0.580E 03	0.239E 03	0.496E 02	0.319E 03
75	TRANS TO WHSLER	0.340E-01	0.133E 04	0.293E-05	0.123E 03	0.119E 04	0.969E 03	0.295E 02	0.187E 03
76	PROFIT	0.732E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	WHOLESALING								
77	LABOR	0.178E-01	0.000E 00	0.229E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
78	DEPRECIATION	0.160E-02	0.641E 02	0.146E-06	0.215E 02	0.398E 02	0.184E 02	0.446E 01	0.202E 02
79	RENT	0.140E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
80	EQUIP.COSTS	0.180E-02	0.743E 02	0.130E-06	0.314E 02	0.394E 02	0.139E 02	0.560E 01	0.244E 02
81	INTEREST	0.120E-02	0.665E 02	0.236E-06	0.177E 02	0.443E 02	0.176E 02	0.724E 01	0.256E 02
82	ADVERTISING	0.300E-03	0.776E 01	0.185E-07	0.235E 01	0.501E 01	0.219E 01	0.648E 00	0.265E 01
83	INSURANCE	0.700E-03	0.103E 02	0.544E-07	0.189E 01	0.799E 01	0.478E 01	0.674E 00	0.298E 01
84	OTHER	0.520E-02	0.107E 03	0.463E-06	0.254E 02	0.774E 02	0.364E 02	0.705E 01	0.338E 02
85	COAL	0.570E-05	0.188E 02	0.300E-09	0.187E 02	0.760E-01	0.427E-01	0.759E-02	0.297E-01
86	REFINED	0.328E-03	0.249E 03	0.929E-08	0.302E 01	0.245E 03	0.222E 03	0.118E 01	0.170E 02
87	ELECT	0.324E-03	0.196E 03	0.152E-07	0.100E 03	0.611E 02	0.161E 02	0.573E 02	0.434E 02
88	GAS	0.423E-04	0.505E 02	0.155E-08	0.274E 00	0.501E 02	0.230E 00	0.911E-01	0.487E 02
89	TRANS TO RETAIL	0.540E-02	0.211E 03	0.465E-06	0.195E 02	0.189E 03	0.154E 03	0.468E 01	0.297E 02
	RETAILING								
90	LABOR	0.448E-01	0.000E 00	0.685E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
91	PACKAGING	0.280E-02	0.278E 03	0.227E-06	0.844E 02	0.184E 03	0.758E 02	0.158E 02	0.101E 03
92	REPAIRS	0.150E-02	0.286E 02	0.124E-06	0.676E 01	0.206E 02	0.971E 01	0.188E 01	0.103E 02
93	DEPRECIATION	0.220E-02	0.881E 02	0.200E-06	0.296E 02	0.547E 02	0.253E 02	0.614E 01	0.278E 02
94	TAXES	0.310E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
95	RENT	0.800E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
96	INTEREST	0.180E-02	0.998E 02	0.354E-06	0.266E 02	0.665E 02	0.263E 02	0.109E 02	0.383E 02
97	ADVERTISING	0.870E-02	0.225E 03	0.536E-06	0.682E 02	0.145E 03	0.634E 02	0.188E 02	0.769E 02
98	OTHER	0.890E-02	0.183E 03	0.793E-06	0.434E 02	0.132E 03	0.623E 02	0.121E 02	0.664E 02
99	PROFIT	0.570E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
100	REFINED	0.502E-03	0.381E 03	0.142E-07	0.463E 01	0.375E 03	0.340E 03	0.180E 01	0.260E 02
101	ELECT	0.113E-02	0.685E 03	0.532E-07	0.349E 03	0.213E 03	0.562E 02	0.200E 03	0.151E 03
102	GAS	0.270E-03	0.322E 03	0.992E-08	0.175E 01	0.320E 03	0.147E 01	0.581E 00	0.311E 03
103	UNALLOCATED PROFIT	0.868E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	HOME PREPARATION								
104	TRANS.	0.810E-02	0.124E 04	0.942E-06	0.156E 03	0.104E 04	0.834E 03	0.678E 02	0.178E 03
105	GAS STOVE-DIR	0.189E-02	0.171E 04	0.528E-07	0.932E 01	0.170E 04	0.780E 01	0.309E 01	0.165E 04
106	GAS STOVE-CAP	0.371E-02	0.274E 03	0.366E-06	0.115E 03	0.146E 03	0.456E 02	0.205E 02	0.957E 02
107	ELECT STOVE-DIR	0.874E-02	0.530E 04	0.411E-06	0.270E 04	0.165E 04	0.435E 03	0.155E 04	0.117E 04
108	ELECT STOVE-CAP	0.459E-02	0.339E 03	0.452E-06	0.143E 03	0.181E 03	0.564E 02	0.253E 02	0.118E 03

	COST MARGIN $/LB	TOTAL COST $/LB	NRG MARGIN BTUS	TOTAL NRG BTUS	JOBS MARGIN MAN-YRS/LB	TOTAL JOBS MAN-YRS/LB
FARM	0.791394E-01	0.791394E-01	0.484822E 04	0.484822E 04	0.580269E-05	0.580269E-05
GRAIN HANDLING & STO	0.724400E-02	0.863833E-01	0.300127E 03	0.514834E 04	0.803689E-06	0.660638E-05
OIL EXTRACTION	0.338607E-02	0.897694E-01	0.152660E 04	0.667494E 04	0.278105E-06	0.688449E-05
MILLING	0.953656E-01	0.185135E 00	0.417938E 03	0.709288E 04	0.335683E-06	0.722017E-05
TEXTURING	0.103713E 00	0.288848E 00	0.453663E 04	0.116295E 05	0.586664E-05	0.130868E-04
PACKAGING	0.149370E 00	0.438218E 00	0.912860E 04	0.207581E 05	0.905628E-05	0.221431E-04
WHOLESALING	0.361000E-01	0.474318E 00	0.105542E 04	0.218135E 05	0.383376E-05	0.259768E-04
RETAILING	0.176202E 00	0.650520E 00	0.229145E 04	0.241050E 05	0.916174E-05	0.351386E-04
HOME PREPARATION	0.270240E-01	0.677544E 00	0.886720E 04	0.329722E 05	0.222486E-05	0.373634E-04

DATA#	NAME	1973 $/LB	BTUS/LB	MAN-YRS/LB	COAL	CRUDE	REFINED	ELECT	GAS
	CORNBELT COWCALF								
1	NATIVE PASTURE	0.119E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
2	TAME PASTURE	0.400E-01	0.154E 04	0.197E-05	0.252E 03	0.123E 04	0.752E 03	0.858E 02	0.449E 03
3	FCT. MEADOW	0.172E-01	0.661E 03	0.646E-06	0.108E 03	0.531E 03	0.323E 03	0.369E 02	0.193E 03
4	NEW SEEDING	0.377E-02	0.145E 03	0.185E-06	0.237E 02	0.116E 03	0.709E 02	0.808E 01	0.423E 02
5	MIXED HAY	0.735E-01	0.283E 04	0.362E-05	0.463E 03	0.227E 04	0.138E 04	0.158E 03	0.826E 03
6	SALT & MIN.	0.195E-02	0.311E 03	0.744E-07	0.505E 02	0.247E 03	0.280E 02	0.224E 02	0.212E 03
7	PROTEIN FEED	0.612E-02	0.236E 03	0.301E-06	0.386E 02	0.189E 03	0.115E 03	0.131E 02	0.688E 02
8	VET MED	0.379E-02	0.208E 03	0.279E-06	0.596E 02	0.138E 03	0.509E 02	0.170E 02	0.824E 02
9	HAULING	0.625E-02	0.209E 03	0.461E-06	0.193E 02	0.187E 03	0.153E 03	0.465E 01	0.295E 02
10	MARKETING COMM.	0.233E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
11	GASOLINE	0.983E-03	0.454E 03	0.170E-07	0.551E 01	0.447E 03	0.405E 03	0.214E 01	0.310E 02
12	DISEL FUEL	0.147E-02	0.112E 04	0.417E-07	0.136E 02	0.110E 04	0.995E 03	0.528E 01	0.762E 02
13	LUBRICANTS	0.369E-03	0.331E 02	0.124E-08	0.402E 00	0.326E 02	0.295E 02	0.156E 00	0.226E 01
14	MACH. REPAIR	0.143E-02	0.323E 02	0.140E-06	0.764E 01	0.233E 02	0.110E 02	0.212E 01	0.117E 02
15	EQUIP. REPAIR	0.268E-02	0.604E 02	0.261E-06	0.143E 02	0.436E 02	0.205E 02	0.396E 01	0.219E 02
16	MACH. LABOR	0.694E-02	0.000E 00	0.147E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
17	MANAGEMENT	0.299E-01	0.000E 00	0.264E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
18	LIVESTOCK LABOR	0.713E-01	0.000E 00	0.150E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
19	INTEREST ON CAP.	0.111E-01	0.465E 03	0.165E-05	0.124E 03	0.310E 03	0.123E 03	0.506E 02	0.179E 03
20	LIVESTOCK DEP.	0.575E-02	0.223E 03	0.376E-06	0.280E 02	0.169E 03	0.119E 03	0.997E 01	0.447E 02
21	DEPRECIATION	0.294E-01	0.145E 04	0.329E-05	0.486E 03	0.898E 03	0.415E 03	0.101E 03	0.457E 03
22	INTEREST ON L.M.&E	0.112E 00	0.466E 04	0.165E-04	0.124E 04	0.311E 04	0.123E 04	0.508E 03	0.179E 04
23	MISC	0.176E-01	0.403E 03	0.136E-05	0.809E 02	0.304E 03	0.172E 03	0.283E 02	0.124E 03
	CORNBELT FEEDLOT								
24	TRANS. TO LOT	0.934E-02	0.304E 03	0.671E-06	0.281E 02	0.272E 03	0.222E 03	0.676E 01	0.429E 02
25	CORN	0.190E 00	0.879E 04	0.112E-04	0.144E 04	0.705E 04	0.429E 04	0.490E 03	0.256E 04
26	SILAGE	0.535E-01	0.247E 04	0.316E-05	0.404E 03	0.198E 04	0.121E 04	0.138E 03	0.721E 03
27	PROTEIN SUPP.	0.607E-01	0.202E 04	0.259E-05	0.331E 03	0.162E 04	0.989E 03	0.113E 03	0.591E 03
28	HAY	0.125E-01	0.364E 03	0.465E-06	0.595E 02	0.292E 03	0.178E 03	0.203E 02	0.106E 03
29	LABOR	0.173E-01	0.000E 00	0.365E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
30	MANAGEMENT	0.864E-02	0.000E 00	0.763E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
31	VET MED	0.475E-02	0.262E 03	0.350E-06	0.749E 02	0.174E 03	0.639E 02	0.214E 02	0.104E 03
32	INTEREST	0.281E-01	0.117E 04	0.416E-05	0.313E 03	0.782E 03	0.310E 03	0.128E 03	0.451E 03
33	DEATH LOSS	0.659E-02	0.234E 03	0.434E-06	0.324E 02	0.195E 03	0.138E 03	0.115E 02	0.517E 02
34	ELECT	0.158E-02	0.956E 03	0.742E-07	0.487E 03	0.297E 03	0.784E 02	0.279E 03	0.211E 03
35	DISEL FUEL	0.299E-02	0.227E 04	0.846E-07	0.275E 02	0.223E 04	0.202E 04	0.107E 02	0.154E 03
36	GASOLINE	0.172E-02	0.794E 03	0.297E-07	0.965E 01	0.782E 03	0.708E 03	0.375E 01	0.542E 02
37	DEPRECIATION	0.157E-01	0.629E 03	0.143E-05	0.211E 03	0.390E 03	0.180E 03	0.438E 02	0.199E 03
38	MARKETING COMM.	0.655E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
39	MISC	0.950E-02	0.344E 03	0.494E-06	0.580E 02	0.273E 03	0.176E 03	0.215E 02	0.891E 02
	MEAT PACKING								
40	LABOR	0.150E-01	0.000E 00	0.196E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
41	PACKAGING	0.200E-02	0.199E 03	0.162E-06	0.603E 02	0.131E 03	0.542E 02	0.113E 02	0.724E 02
42	TRANS.	0.600E-02	0.175E 03	0.385E-06	0.161E 02	0.156E 03	0.127E 03	0.368E 01	0.246E 02
43	BUSINESS TAXES	0.100E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
44	DEPRECIATION	0.300E-02	0.120E 03	0.273E-06	0.404E 02	0.746E 02	0.345E 02	0.837E 01	0.380E 02
45	RENT	0.200E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
46	REPAIRS	0.200E-02	0.381E 02	0.165E-06	0.902E 01	0.275E 02	0.129E 02	0.251E 01	0.138E 02
47	ADVERTISING	0.100E-02	0.259E 02	0.616E-07	0.794E 01	0.167E 02	0.729E 01	0.216E 01	0.884E 01
48	INTEREST	0.300E-02	0.166E 03	0.590E-06	0.443E 02	0.111E 03	0.439E 02	0.181E 02	0.639E 02
49	PROFIT	0.500E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
50	COAL	0.274E-03	0.903E 03	0.144E-07	0.899E 03	0.365E 01	0.205E 01	0.365E 00	0.143E 01
51	FUEL OIL	0.154E-03	0.117E 03	0.436E-08	0.142E 01	0.115E 03	0.104E 03	0.551E 00	0.796E 01
52	GAS	0.454E-03	0.103E 04	0.317E-07	0.560E 01	0.102E 04	0.469E 01	0.106E 01	0.993E [illegible]
53	ELECT.	0.112E-02	0.679E 03	0.526E-07	0.345E 03	0.211E 03	0.556E 02	0.199E 03	0.150E 03
54	OTHER	0.162E-01	0.330E 03	0.143E-05	0.780E 02	0.238E 03	0.112E 03	0.217E 02	0.119E 03

	WHOLESALING								
55	TRANS. -INTERCITY	0.110E-01	0.320E 03	0.706E-06	0.296E 02	0.286E 03	0.234E 03	0.711E 01	0.451E 02
56	LABOR	0.483E-01	0.000E 00	0.622E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
57	DEPRECIATION	0.440E-02	0.176E 03	0.401E-06	0.592E 02	0.109E 03	0.506E 02	0.123E 02	0.557E 02
58	RENT	0.370E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
59	EQUIPMENT	0.490E-02	0.266E 03	0.362E-06	0.107E 03	0.144E 03	0.482E 02	0.237E 02	0.920E 02
60	INTEREST	0.330E-02	0.183E 03	0.649E-06	0.488E 02	0.122E 03	0.483E 02	0.199E 02	0.703E 02
61	ADVERTISING	0.900E-03	0.233E 02	0.554E-07	0.706E 01	0.150E 02	0.656E 01	0.194E 01	0.795E 01
62	INSURANCE	0.190E-02	0.279E 02	0.148E-06	0.512E 01	0.217E 02	0.130E 02	0.183E 01	0.808E 01
63	OTHER	0.141E-01	0.290E 03	0.126E-05	0.688E 02	0.210E 03	0.987E 02	0.191E 02	0.105E 03
64	TRANS-INTRACITY	0.540E-02	0.157E 03	0.347E-06	0.145E 02	0.141E 03	0.115E 03	0.349E 01	0.221E 02
65	COAL	0.165E-04	0.543E 02	0.869E-09	0.541E 02	0.220E 00	0.124E 00	0.220E-01	0.859E-01
66	REFINED	0.950E-03	0.721E 03	0.269E-07	0.875E 01	0.710E 03	0.643E 03	0.340E 01	0.491E 02
67	ELECT	0.941E-03	0.571E 03	0.443E-07	0.291E 03	0.177E 03	0.468E 02	0.167E 03	0.126E 03
68	GAS	0.123E-03	0.119E 03	0.368E-08	0.649E 00	0.119E 03	0.543E 00	0.215E 00	0.115E 03
	RETAILING								
69	LABOR	0.159E 00	0.000E 00	0.243E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
70	PACKAGING	0.280E-01	0.278E 04	0.227E-05	0.844E 03	0.184E 04	0.758E 03	0.158E 03	0.101E 04
71	BUS. TAXES	0.100E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
72	DEPRECIATION	0.500E-02	0.200E 03	0.456E-06	0.673E 02	0.124E 03	0.575E 02	0.140E 02	0.633E 02
73	RENT	0.700E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
74	REPAIRS	0.300E-02	0.571E 02	0.247E-06	0.135E 02	0.413E 02	0.194E 02	0.376E 01	0.207E 02
75	ADVERTISING	0.210E-01	0.544E 03	0.129E-05	0.165E 03	0.351E 03	0.153E 03	0.454E 02	0.186E 03
76	INTEREST	0.200E-02	0.111E 03	0.393E-06	0.295E 02	0.739E 02	0.293E 02	0.121E 02	0.426E 02
77	PROFIT	0.170E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
78	ELECT	0.356E-02	0.216E 04	0.168E-05	0.110E 04	0.671E 03	0.177E 03	0.630E 03	0.477E 03
79	REFINED	0.159E-02	0.121E 04	0.451E-07	0.147E 02	0.119E 04	0.108E 04	0.570E 01	0.822E 02
80	GAS	0.854E-03	0.102E 04	0.314E-07	0.554E 01	0.101E 04	0.464E 01	0.184E 01	0.982E 03
81	OTHER	0.250E-01	0.515E 03	0.223E-05	0.122E 03	0.372E 03	0.175E 03	0.339E 02	0.186E 03
	HOME PREPARATION								
82	TRANS.	0.810E-02	0.124E 04	0.942E-06	0.156E 03	0.104E 04	0.834E 03	0.678E 02	0.178E 03
83	REFRIDGE.-DIR	0.165E-01	0.998E 04	0.775E-06	0.508E 04	0.310E 04	0.818E 03	0.291E 04	0.220E 04
84	REFRIDGE.-CAP	0.615E-02	0.443E 03	0.565E-06	0.189E 03	0.231E 03	0.727E 02	0.375E 02	0.151E 03
85	FREEZER-DIR	0.107E-01	0.405E 04	0.314E-06	0.206E 04	0.126E 04	0.332E 03	0.118E 04	0.894E 03
86	FREEZER-CAP	0.173E-02	0.125E 03	0.159E-06	0.531E 02	0.651E 02	0.205E 02	0.106E 02	0.426E 02
87	GAS STOVE-DIR	0.189E-02	0.171E 04	0.528E-07	0.932E 01	0.170E 04	0.780E 01	0.309E 01	0.165E 04
88	GAS STOVE-CAP	0.371E-02	0.274E 03	0.366E-06	0.115E 03	0.146E 03	0.456E 02	0.205E 02	0.957E 02
89	ELECT STOVE-DIR	0.874E-02	0.530E 04	0.411E-06	0.270E 04	0.165E 04	0.435E 03	0.155E 04	0.117E 04
90	ELECT STOVE-CAP	0.459E-02	0.339E 03	0.452E-06	0.143E 03	0.181E 03	0.564E 02	0.253E 02	0.118E 03

	COST MARGIN $/LB	TOTAL COST $/LB	NRG MARGIN BTUS	TOTAL NRG BTUS	JOBS MARGIN MAN-YRS/LB	TOTAL JOBS MAN-YRS/LB
CORNBELT COWCALF	0.457240E 00	0.457240E 00	0.150163E 05	0.150163E 05	0.505576E-04	0.505576E-04
CORNBELT FEEDLOT	0.429758E 00	0.886998E 00	0.206099E 05	0.356262E 05	0.295876E-04	0.801452E-04
MEAT PACKING	0.580004E-01	0.944999E 00	0.378057E 04	0.394067E 05	0.512427E-05	0.852695E-04
WHOLESALING	0.999300E-01	0.104493E 01	0.290965E 04	0.423164E 05	0.102240E-04	0.954935E-04
RETAILING	0.283004E 00	0.132793E 01	0.859266E 04	0.509090E 05	0.314455E-04	0.126939E-03
HOME PREPARATION	0.620650E-01	0.139000E 01	0.234663E 05	0.743753E 05	0.403868E-05	0.130978E-03

DATA#	NAME	1973 $/LB	BTUS/LB	MAN-YRS/LB	COAL	CRUDE	REFINED	ELECT	GAS
	TEXAS COWCALF								
1	LEGUME HAY	0.432E-02	0.166E 03	0.213E-06	0.272E 02	0.133E 03	0.813E 02	0.927E 01	0.485E 02
2	PROTEIN FEED	0.314E-01	0.121E 04	0.154E-05	0.198E 03	0.969E 03	0.591E 03	0.673E 02	0.353E 03
3	SALT & MIN.	0.147E-02	0.312E 03	0.747E-07	0.507E 02	0.248E 03	0.281E 02	0.225E 02	0.213E 03
4	VET MED	0.525E-02	0.344E 03	0.459E-06	0.983E 02	0.228E 03	0.839E 02	0.251E 02	0.136E 03
5	SALE COMM.	0.962E-03	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
6	ELECT	0.219E-02	0.133E 04	0.103E-06	0.677E 03	0.413E 03	0.109E 03	0.388E 03	0.294E 03
7	NATURAL GAS	0.758E-03	0.904E 02	0.278E-08	0.492E 00	0.898E 02	0.412E 00	0.163E 00	0.872E 02
8	GASOLINE	0.207E-02	0.955E 03	0.357E-07	0.116E 02	0.941E 03	0.852E 03	0.451E 01	0.651E 02
9	LUBRICANTS	0.266E-03	0.239E 02	0.893E-09	0.290E 00	0.235E 02	0.213E 02	0.113E 00	0.163E 01
10	MACH. REPAIR	0.758E-03	0.167E 02	0.724E-07	0.396E 01	0.121E 02	0.569E 01	0.110E 01	0.696E 01
11	EQUIP. REPAIR	0.121E-01	0.268E 03	0.116E-05	0.635E 02	0.194E 03	0.912E 02	0.177E 02	0.971E 02
12	MACH. LABOR	0.790E-02	0.000E 00	0.167E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
13	LIVESTOCK LABOR	0.143E-03	0.000E 00	0.303E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
14	INTEREST ON OP.CAP	0.238E-02	0.993E 02	0.352E-06	0.265E 02	0.662E 02	0.262E 02	0.108E 02	0.382E 02
15	MANAGEMENT CHG.	0.124E-01	0.000E 00	0.109E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
16	DEPRECIATION	0.231E-01	0.113E 04	0.258E-05	0.381E 03	0.734E 03	0.325E 03	0.790E 02	0.358E 03
17	LIVESTOCK DEP.	0.374E-02	0.308E 03	0.571E-06	0.426E 02	0.256E 03	0.181E 03	0.152E 02	0.680E 02
18	TAXES	0.590E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
19	INTEREST	0.112E 00	0.468E 04	0.166E-04	0.125E 04	0.312E 04	0.124E 04	0.510E 03	0.180E 04
20	INSURANCE	0.270E-02	0.422E 02	0.224E-06	0.775E 01	0.328E 02	0.196E 02	0.277E 01	0.122E 02
21	RESIDUAL LAND CHG	0.241E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
	TEXAS FEEDLOT								
22	TRANS. TO LOT	0.350E-02	0.114E 03	0.252E-06	0.105E 02	0.102E 03	0.832E 02	0.253E 01	0.161E 02
23	MARKETING COMM.	0.614E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
24	SORGHUM GRAIN	0.167E 00	0.770E 04	0.984E-05	0.126E 04	0.618E 04	0.376E 04	0.429E 03	0.225E 04
25	CORN	0.990E-01	0.415E 04	0.531E-05	0.679E 03	0.333E 04	0.203E 04	0.231E 03	0.121E 04
26	UREA	0.227E-02	0.430E 03	0.198E-06	0.103E 03	0.304E 03	0.604E 02	0.375E 02	0.235E 03
27	COTTONSEED HULLS	0.120E-01	0.944E 03	0.149E-05	0.206E 03	0.685E 03	0.384E 03	0.858E 02	0.283E 03
28	ALFALFA CUBES	0.495E-01	0.144E 04	0.184E-05	0.235E 03	0.115E 04	0.703E 03	0.802E 02	0.420E 03
29	LABOR	0.696E-02	0.000E 00	0.147E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
30	MANAGEMENT	0.536E-02	0.000E 00	0.614E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
31	VET MED	0.475E-02	0.262E 03	0.350E-06	0.749E 02	0.174E 03	0.639E 02	0.214E 02	0.104E 03
32	INTEREST	0.218E-01	0.913E 03	0.324E-05	0.243E 03	0.608E 03	0.241E 03	0.994E 02	0.351E 03
33	ELECT	0.322E-02	0.195E 04	0.151E-06	0.993E 03	0.606E 03	0.160E 03	0.569E 03	0.431E 03
34	GASOLINE	0.270E-02	0.125E 04	0.466E-07	0.152E 02	0.123E 04	0.111E 04	0.590E 01	0.851E 02
35	LUBRICANTS	0.410E-03	0.368E 02	0.137E-08	0.447E 00	0.362E 02	0.328E 02	0.174E 00	0.251E 01
36	DEPRECIATION	0.850E-02	0.341E 03	0.776E-06	0.115E 03	0.212E 03	0.979E 02	0.238E 02	0.108E 03
37	R&M FEED MILL	0.135E-02	0.301E 02	0.130E-06	0.712E 01	0.217E 02	0.102E 02	0.198E 01	0.109E 02
38	R&M AUTO	0.676E-03	0.287E 02	0.487E-07	0.704E 01	0.206E 02	0.131E 02	0.180E 01	0.695E 01
39	R&M BUILDINGS	0.352E-02	0.135E 03	0.168E-06	0.288E 02	0.102E 03	0.655E 02	0.595E 01	0.379E 02
40	TELEPHONE	0.154E-02	0.236E 02	0.884E-07	0.471E 01	0.177E 02	0.103E 02	0.194E 01	0.695E 01
41	DEATH LOSS	0.109E-01	0.386E 03	0.716E-06	0.534E 02	0.321E 03	0.227E 03	0.190E 02	0.852E 02
42	MISC	0.950E-02	0.356E 03	0.473E-06	0.714E 02	0.267E 03	0.160E 03	0.286E 02	0.996E 02
	MEAT PACKING								
43	LABOR	0.150E-01	0.000E 00	0.196E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
44	PACKAGING	0.200E-02	0.199E 03	0.162E-06	0.603E 02	0.131E 03	0.542E 02	0.113E 02	0.724E 02
45	TRANS.	0.600E-02	0.175E 03	0.385E-06	0.161E 02	0.156E 03	0.127E 03	0.388E 01	0.24[illegible]E 02
46	BUSINESS TAXES	0.100E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.0[illegible]E 00
47	DEPRECIATION	0.300E-02	0.120E 03	0.273E-06	0.404E 02	0.746E 02	0.345E 02	0.837E 01	0.36[illegible]E 02
48	RENT	0.200E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.0[illegible]E 00
49	REPAIRS	0.200E-02	0.381E 02	0.165E-06	0.902E 01	0.275E 02	0.129E 02	0.251E 01	0.133E 02
50	ADVERTISING	0.100E-02	0.259E 02	0.616E-07	0.784E 01	0.167E 02	0.729E 01	0.216E 01	0.684E 01
51	INTEREST	0.300E-02	0.166E 03	0.590E-06	0.443E 02	0.111E 03	0.439E 02	0.181E 02	0.639E 02
52	PROFIT	0.500E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00

53	COAL	0.274E-03	0.903E 03	0.144E-07	0.899E 03	0.365E 01	0.205E 01	0.365E 00	0.143E 01
54	FUEL OIL	0.154E-03	0.117E 03	0.436E-08	0.142E 01	0.115E 03	0.104E 03	0.551E 00	0.796E 01
55	GAS	0.454E-03	0.103E 04	0.317E-07	0.560E 01	0.102E 04	0.469E 01	0.186E 01	0.993E 03
56	ELECT.	0.112E-02	0.678E 03	0.526E-07	0.345E 03	0.211E 03	0.556E 02	0.198E 03	0.150E 03
57	OTHER	0.160E-01	0.330E 03	0.143E-05	0.780E 02	0.238E 03	0.112E 03	0.217E 02	0.119E 03
	WHOLESALING								
58	TRANS. -INTERCITY	0.110E-01	0.320E 03	0.706E-06	0.296E 02	0.286E 03	0.234E 03	0.711E 01	0.451E 02
59	LABOR	0.483E-01	0.000E 00	0.622E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
60	DEPRECIATION	0.440E-02	0.176E 03	0.401E-06	0.592E 02	0.109E 03	0.506E 02	0.123E 02	0.557E 02
61	RENT	0.370E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
62	EQUIPMENT	0.490E-02	0.266E 03	0.362E-06	0.107E 03	0.144E 03	0.482E 02	0.237E 02	0.920E 02
63	INTEREST	0.330E-02	0.183E 03	0.649E-06	0.488E 02	0.122E 03	0.483E 02	0.199E 02	0.703E 02
64	ADVERTISING	0.900E-03	0.233E 02	0.554E-07	0.706E 01	0.150E 02	0.656E 01	0.194E 01	0.795E 01
65	INSURANCE	0.190E-02	0.279E 02	0.148E-06	0.512E 01	0.217E 02	0.130E 02	0.183E 01	0.808E 01
66	OTHER	0.141E-01	0.290E 03	0.126E-05	0.688E 02	0.210E 03	0.987E 02	0.191E 02	0.105E 03
67	TRANS-INTRACITY	0.540E-02	0.157E 03	0.347E-06	0.145E 02	0.141E 03	0.115E 03	0.349E 01	0.221E 02
68	COAL	0.165E-04	0.543E 02	0.869E-09	0.541E 02	0.220E 00	0.124E 00	0.220E-01	0.859E-01
69	REFINED	0.950E-03	0.721E 03	0.269E-07	0.875E 01	0.710E 03	0.643E 03	0.340E 01	0.491E 02
70	ELECT	0.941E-03	0.571E 03	0.443E-07	0.291E 03	0.177E 03	0.468E 02	0.167E 03	0.126E 03
71	GAS	0.123E-03	0.119E 03	0.368E-08	0.649E 00	0.119E 03	0.543E 00	0.215E 00	0.115E 03
	RETAILING								
72	LABOR	0.159E 00	0.000E 00	0.243E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
73	PACKAGING	0.280E-01	0.278E 04	0.227E-05	0.844E 03	0.184E 04	0.758E 03	0.156E 03	0.101E 04
74	BUS. TAXES	0.100E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
75	DEPRECIATION	0.500E-02	0.200E 03	0.456E-06	0.673E 02	0.124E 03	0.575E 02	0.140E 02	0.633E 02
76	RENT	0.700E-02	0.111E 03	0.220E-06	0.221E 02	0.846E 02	0.413E 02	0.754E 01	0.409E 02
77	REPAIRS	0.300E-02	0.571E 02	0.247E-06	0.135E 02	0.413E 02	0.194E 02	0.376E 01	0.207E 02
78	ADVERTISING	0.210E-01	0.544E 03	0.129E-05	0.165E 03	0.351E 03	0.153E 03	0.454E 02	0.186E 03
79	INTEREST	0.200E-02	0.111E 03	0.393E-06	0.295E 02	0.739E 02	0.293E 02	0.121E 02	0.426E 02
80	PROFIT	0.170E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
81	ELECT	0.356E-02	0.216E 04	0.168E-06	0.110E 04	0.671E 03	0.177E 03	0.630E 03	0.477E 03
82	REFINED	0.159E-02	0.121E 04	0.451E-07	0.147E 02	0.119E 04	0.108E 04	0.570E 01	0.822E 02
83	GAS	0.854E-03	0.102E 04	0.314E-07	0.554E 01	0.101E 04	0.464E 01	0.184E 01	0.982E 03
84	OTHER	0.250E-01	0.515E 03	0.223E-05	0.122E 03	0.372E 03	0.175E 03	0.339E 02	0.196E 03
	HOME PREPARATION								
85	TRANS.	0.810E-02	0.124E 04	0.942E-06	0.156E 03	0.104E 04	0.834E 03	0.678E 02	0.178E 03
86	REFRIDGE.-DIR	0.165E-01	0.998E 04	0.775E-06	0.508E 04	0.310E 04	0.818E 03	0.291E 04	0.220E 04
87	REFRIDGE.-CAP	0.615E-02	0.443E 03	0.565E-06	0.189E 03	0.231E 03	0.727E 02	0.375E 02	0.151E 03
88	FREEZER-DIR	0.107E-01	0.405E 04	0.314E-06	0.206E 04	0.126E 04	0.332E 03	0.118E 04	0.894E 03
89	FREEZER-CAP	0.173E-02	0.125E 03	0.159E-06	0.531E 02	0.651E 02	0.205E 02	0.106E 02	0.426E 02
90	GAS STOVE-DIR	0.189E-02	0.171E 04	0.528E-07	0.932E 01	0.170E 04	0.780E 01	0.309E 01	0.165E 04
91	GAS STOVE-CAP	0.371E-02	0.274E 03	0.366E-06	0.115E 03	0.146E 03	0.456E 02	0.205E 02	0.957E 02
92	ELECT STOVE-DIR	0.874E-02	0.530E 04	0.411E-06	0.270E 04	0.165E 04	0.435E 03	0.155E 04	0.117E 04
93	ELECT STOVE-CAP	0.459E-02	0.339E 03	0.452E-06	0.143E 03	0.181E 03	0.564E 02	0.253E 02	0.118E 03

	COST MARGIN $/LB	TOTAL COST $/LB	NRG MARGIN BTUS	TOTAL NRG BTUS	JOBS MARGIN MAN-YRS/LB	TOTAL JOBS MAN-YRS/LB
TEXAS COWCALF	0.478976E 00	0.478976E 00	0.109795E 05	0.109795E 05	0.268001E-04	0.268001E-04
TEXAS FEEDLOT	0.412966E 00	0.891942E 00	0.204902E 05	0.314697E 05	0.272064E-04	0.540065E-04
MEAT PACKING	0.580004E-01	0.949942E 00	0.378057E 04	0.352503E 05	0.512427E-05	0.591308E-04
WHOLESALING	0.999300E-01	0.104987E 01	0.290965E 04	0.381600E 05	0.102240E-04	0.693548E-04
RETAILING	0.283004E 00	0.133288E 01	0.870398E 04	0.468639E 05	0.316654E-04	0.101020E-03
HOME PREPARATION	0.620650E-01	0.139494E 01	0.234663E 05	0.703302E 05	0.403868E-05	0.105059E-03

DATA#	NAME	1973 $/LB	BTUS/LB	MAN-YRS/LB	COAL	CRUDE	REFINED	ELECT	GAS
	INTERMOUTAIN COWCALF								
1	GRASS HAY	0.437E-01	0.168E 04	0.215E-05	0.275E 03	0.175E 04	0.823E 03	0.938E 02	0.491E 03
2	LEGUME HAY	0.492E-01	0.180E 04	0.242E-05	0.310E 03	0.152E 04	0.926E 03	0.105E 03	0.553E 03
3	PASTURE	0.158E-01	0.159E 03	0.354E-06	0.395E 02	0.152E 03	0.740E 02	0.135E 02	0.733E 02
4	PUB. GRAZING	0.191E-01	0.242E 03	0.477E-06	0.479E 02	0.184E 03	0.897E 02	0.164E 02	0.889E 02
5	PROTEIN SUPP.	0.459E-02	0.177E 03	0.226E-06	0.239E 02	0.142E 03	0.863E 02	0.984E 01	0.515E 02
6	SALT & MIN.	0.330E-02	0.658E 03	0.167E-06	0.113E 03	0.553E 03	0.628E 02	0.503E 02	0.475E 03
7	VET. MED	0.317E-02	0.175E 03	0.233E-06	0.500E 02	0.115E 03	0.426E 02	0.143E 02	0.690E 02
8	MACH. REPAIR	0.485E-02	0.108E 03	0.467E-06	0.255E 02	0.780E 02	0.367E 02	0.710E 01	0.391E 02
9	EQUIP. REPAIR	0.168E-02	0.371E 02	0.160E-06	0.878E 01	0.268E 02	0.126E 02	0.244E 01	0.134E 02
10	MACH. LABOR	0.200E-01	0.000E 00	0.423E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
11	EQUIP. LABOR	0.266E-03	0.000E 00	0.562E-07	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
12	LIVESTOCK LABOR	0.345E-01	0.000E 00	0.737E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
13	INTEREST	0.113E-01	0.472E 03	0.167E-05	0.126E 03	0.314E 03	0.124E 03	0.514E 02	0.181E 03
14	GASOLINE	0.352E-02	0.163E 04	0.608E-07	0.198E 02	0.160E 04	0.145E 04	0.768E 01	0.111E 03
15	DISEL FUEL	0.913E-02	0.692E 03	0.259E-07	0.841E 01	0.682E 03	0.617E 03	0.327E 01	0.472E 02
16	LUBRICANTS	0.229E-02	0.206E 03	0.769E-08	0.250E 01	0.203E 03	0.184E 03	0.973E 00	0.140E 02
17	TAXES	0.772E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
18	DEP. ON LIVESTOCK	0.255E-01	0.898E 03	0.166E-05	0.124E 03	0.747E 03	0.528E 03	0.442E 02	0.198E 03
19	DEPRECIATION	0.157E-01	0.770E 03	0.175E-05	0.259E 03	0.478E 03	0.221E 03	0.537E 02	0.243E 03
20	INTEREST	0.978E-01	0.409E 04	0.145E-04	0.109E 04	0.272E 04	0.108E 04	0.445E 03	0.157E 04
21	INSURANCE	0.283E-02	0.442E 02	0.234E-06	0.810E 01	0.343E 02	0.205E 02	0.289E 01	0.128E 02
22	MANAGE. CHARGE	0.395E-02	0.000E 00	0.790E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
23	HAULING	0.121E-01	0.405E 03	0.894E-06	0.375E 02	0.362E 03	0.296E 03	0.901E 01	0.571E 02
24	MARKETING	0.451E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
25	MISC	0.645E-02	0.160E 03	0.442E-06	0.285E 02	0.125E 03	0.739E 02	0.103E 02	0.475E 02
	CALIF FEEDLOT								
26	TRANS. TO LOT	0.245E-01	0.799E 03	0.176E-05	0.738E 02	0.714E 03	0.583E 03	0.177E 02	0.113E 03
27	COMMISION	0.461E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
28	BARLEY	0.248E 00	0.114E 05	0.146E-04	0.197E 04	0.918E 04	0.559E 04	0.636E 03	0.334E 04
29	COTTONSEED MEAL	0.128E-01	0.101E 04	0.159E-05	0.220E 03	0.729E 03	0.409E 03	0.913E 02	0.301E 03
30	UREA	0.279E-02	0.527E 03	0.243E-06	0.126E 03	0.372E 03	0.741E 02	0.459E 02	0.288E 03
31	ALFALFA HAY	0.375E-01	0.109E 04	0.139E-05	0.178E 03	0.874E 03	0.533E 03	0.607E 02	0.318E 03
32	LABOR	0.876E-02	0.000E 00	0.185E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
33	MANAGE. LABOR	0.876E-02	0.000E 00	0.773E-06	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
34	VET. MED	0.475E-02	0.262E 03	0.350E-06	0.749E 02	0.174E 03	0.639E 02	0.214E 02	0.104E 03
35	INTEREST	0.346E-01	0.145E 04	0.514E-05	0.336E 03	0.965E 03	0.382E 03	0.158E 03	0.557E 03
36	GASOLINE	0.270E-02	0.125E 04	0.466E-07	0.152E 02	0.123E 04	0.111E 04	0.590E 01	0.851E 02
37	LUBRICANTS	0.410E-03	0.368E 02	0.137E-08	0.447E 00	0.362E 02	0.328E 02	0.174E 00	0.251E 01
38	ELECT	0.322E-02	0.195E 04	0.151E-06	0.993E 03	0.606E 03	0.160E 03	0.569E 03	0.431E 03
39	DEPRECIATION	0.853E-02	0.341E 03	0.776E-06	0.115E 03	0.212E 03	0.979E 02	0.238E 02	0.108E 03
40	R&M FEED MILL	0.135E-02	0.301E 02	0.130E-06	0.712E 01	0.217E 02	0.102E 02	0.198E 01	0.109E 02
41	R&M AUTO	0.676E-03	0.287E 02	0.487E-07	0.704E 01	0.206E 02	0.131E 02	0.180E 01	0.695E 01
42	R&M BUILDINGS	0.352E-02	0.135E 03	0.168E-06	0.288E 02	0.102E 03	0.655E 02	0.595E 01	0.338E 02
43	TELEPHONE	0.154E-02	0.236E 02	0.884E-07	0.471E 01	0.177E 02	0.103E 02	0.194E 01	0.695E 01
44	DEATH LOSS	0.109E-01	0.386E 03	0.716E-06	0.534E 02	0.321E 03	0.227E 03	0.190E 02	0.852E 02
45	MISC	0.950E-02	0.353E 03	0.507E-06	0.706E 02	0.265E 03	0.159E 03	0.282E 02	0.984E 02
	MEAT PACKING								
46	LABOR	0.150E-01	0.000E 00	0.196E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
47	PACKAGING	0.200E-02	0.199E 03	0.162E-06	0.603E 02	0.131E 03	0.542E 02	0.113E 02	0.724E 02
48	TRANS.	0.600E-02	0.175E 03	0.385E-06	0.161E 02	0.156E 03	0.127E 03	0.388E 01	0.246E 02
49	BUSINESS TAXES	0.100E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
50	DEPRECIATION	0.300E-02	0.120E 03	0.273E-06	0.404E 02	0.746E 02	0.345E 02	0.837E 01	0.380E 02
51	RENT	0.200E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
52	REPAIRS	0.200E-02	0.381E 02	0.165E-06	0.992E 01	0.275E 02	0.129E 02	0.251E 01	0.138E 02
53	ADVERTISING	0.100E-02	0.259E 02	0.616E-07	0.784E 01	0.167E 02	0.729E 01	0.216E 01	0.894E 01
54	INTEREST	0.300E-02	0.166E 03	0.590E-06	0.443E 02	0.111E 03	0.439E 02	0.181E 02	0.639E 02
55	PROFIT	0.500E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
56	COAL	0.274E-03	0.903E 03	0.144E-07	0.899E 03	0.365E 01	0.205E 01	0.365E 00	0.143E 01
57	FUEL OIL	0.154E-03	0.117E 03	0.436E-08	0.142E 01	0.115E 03	0.104E 03	0.551E 00	0.796E 01
58	GAS	0.454E-03	0.103E 04	0.317E-07	0.560E 01	0.102E 04	0.469E 01	0.186E 01	0.993E 03
59	ELECT.	0.112E-02	0.678E 03	0.526E-07	0.345E 03	0.211E 03	0.556E 02	0.198E 03	0.150E 03
60	OTHER	0.160E-01	0.330E 03	0.143E-05	0.780E 02	0.238E 03	0.112E 03	0.217E 02	0.119E 03

WHOLESALING								
61 TRANS. -INTERCITY	0.110E-01	0.320E 03	0.706E-06	0.296E 02	0.286E 03	0.234E 03	0.711E 01	0.451E 02
62 LABOR	0.483E-01	0.000E 00	0.622E-05	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
63 DEPRECIATION	0.443E-02	0.176E 03	0.401E-06	0.592E 02	0.109E 03	0.506E 02	0.123E 02	0.557E 02
64 RENT	0.370E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
65 EQUIPMENT	0.490E-02	0.266E 03	0.362E-06	0.107E 03	0.144E 03	0.482E 02	0.237E 02	0.920E 02
66 INTEREST	0.330E-02	0.183E 03	0.649E-06	0.488E 02	0.122E 03	0.483E 02	0.199E 02	0.703E 02
67 ADVERTISING	0.900E-03	0.233E 02	0.554E-07	0.706E 01	0.150E 02	0.656E 01	0.194E 01	0.795E 01
68 INSURANCE	0.190E-02	0.279E 02	0.148E-06	0.512E 01	0.217E 02	0.130E 02	0.183E 01	0.808E 01
69 OTHER	0.141E-01	0.290E 03	0.126E-05	0.688E 02	0.210E 03	0.987E 02	0.191E 02	0.105E 03
70 TRANS-INTRACITY	0.540E-02	0.157E 03	0.347E-06	0.145E 02	0.141E 03	0.115E 03	0.349E 01	0.221E 02
71 COAL	0.165E-04	0.543E 02	0.869E-09	0.541E 02	0.220E 00	0.124E 00	0.220E-01	0.859E-01
72 REFINED	0.950E-03	0.721E 03	0.269E-07	0.875E 01	0.710E 03	0.643E 03	0.340E 01	0.491E 02
73 ELECT	0.941E-03	0.571E 03	0.443E-07	0.291E 03	0.177E 03	0.468E 02	0.167E 03	0.126E 03
74 GAS	0.123E-03	0.119E 03	0.768E-08	0.649E 00	0.119E 03	0.543E 00	0.215E 00	0.115E 03
RETAILING								
75 LABOR	0.159E 00	0.000E 00	0.243E-04	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
76 PACKAGING	0.290E-01	0.278E 04	0.227E-05	0.844E 03	0.184E 04	0.758E 03	0.158E 03	0.101E 04
77 BUS. TAXES	0.100E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
78 DEPRECIATION	0.500E-02	0.200E 03	0.456E-06	0.673E 02	0.124E 03	0.575E 02	0.140E 02	0.633E 02
79 RENT	0.700E-02	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
80 REPAIRS	0.300E-02	0.571E 02	0.247E-06	0.135E 02	0.413E 02	0.194E 02	0.376E 01	0.207E 02
81 ADVERTISING	0.210E-01	0.544E 03	0.129E-05	0.165E 03	0.351E 03	0.153E 03	0.454E 02	0.186E 03
82 INTEREST	0.200E-02	0.111E 03	0.393E-06	0.295E 02	0.739E 02	0.293E 02	0.121E 02	0.426E 02
83 PROFIT	0.170E-01	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00	0.000E 00
84 ELECT	0.356E-02	0.216E 04	0.168E-06	0.110E 04	0.671E 03	0.177E 03	0.630E 03	0.477E 03
85 REFINED	0.159E-02	0.121E 04	0.451E-07	0.147E 02	0.119E 04	0.108E 04	0.570E 01	0.822E 02
86 GAS	0.854E-03	0.102E 04	0.314E-07	0.554E 01	0.101E 04	0.464E 01	0.184E 01	0.982E 03
87 OTHER	0.250E-01	0.515E 03	0.223E-05	0.122E 03	0.372E 03	0.175E 03	0.339E 02	0.186E 03
HOME PREPARATION								
88 TRANS.	0.810E-02	0.124E 04	0.942E-06	0.156E 03	0.104E 04	0.834E 03	0.678E 02	0.178E 03
89 REFRIDGE.-DIP	0.165E-01	0.998E 04	0.775E-06	0.508E 04	0.310E 04	0.818E 03	0.291E 04	0.220E 04
90 REFRIDGE.-CAP	0.615E-02	0.443E 03	0.565E-06	0.189E 03	0.231E 03	0.727E 02	0.375E 02	0.151E 03
91 FREEZER-DIR	0.107E-01	0.405E 04	0.314E-06	0.206E 04	0.126E 04	0.332E 03	0.118E 04	0.894E 03
92 FREEZER-CAP	0.173E-02	0.125E 03	0.159E-06	0.531E 02	0.651E 02	0.205E 02	0.106E 02	0.426E 02
93 GAS STOVE-DIR	0.189E-02	0.171E 04	0.528E-07	0.932E 01	0.170E 04	0.780E 01	0.309E 01	0.165E 04
94 GAS STOVE-CAP	0.371E-02	0.274E 03	0.366E-06	0.115E 03	0.146E 03	0.456E 02	0.205E 02	0.957E 02
95 ELECT STOVE-DIR	0.874E-02	0.530E 04	0.411E-06	0.270E 04	0.165E 04	0.435E 03	0.155E 04	0.117E 04
96 ELECT STOVE-CAP	0.459E-02	0.339E 03	0.452E-06	0.143E 03	0.181E 03	0.564E 02	0.253E 02	0.118E 03

	COST MARGIN $/LB	TOTAL COST $/LB	NRG MARGIN BTUS	TOTAL NRG BTUS	JOBS MARGIN MAN-YRS/LB	TOTAL JOBS MAN-YRS/LB
INTERMOUTAIN COWCALF	0.408364E 00	0.408364E 00	0.145745E 05	0.145745E 05	0.404008E-04	0.404008E-04
CALIF FEEDLOT	0.429410E 00	0.837774E 00	0.211132E 05	0.356877E 05	0.303712E-04	0.707720E-04
MEAT PACKING	0.580004E-01	0.895775E 00	0.378057E 04	0.394682E 05	0.512427E-05	0.758963E-04
WHOLESALING	0.999300E-01	0.995705E 00	0.290965E 04	0.423779E 05	0.102240E-04	0.861203E-04
RETAILING	0.283004E 00	0.127871E 01	0.859266E 04	0.509705E 05	0.314455E-04	0.117566E-03
HOME PREPARATION	0.620650E-01	0.134077E 01	0.234663E 05	0.744368E 05	0.403868E-05	0.121604E-03

APPENDIX F.

TABLES

Tables A through R3 list the input data. Most inputs are dollar costs per unit of output, the unit being that listed next to the name of the step. These dollar costs are in 1973 dollars; the deflator listed is the ratio $\frac{1973}{1967}$, used as described in Appendix A. The deflator source is listed next to it. (These correspond to those sources listed in reference [31].) For actual energy and labor inputs the quantities are listed in the "BTUS" and "JOBS" columns. These entries are zero where the inputs are materials. The correspondence between the numbers in columns labeled "I/O#" in Tables A through R3 and Bureau of Economic Analysis Input-Output numbers are listed in Table S.

TABLE A

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	FARM (BU)					
1	FERTILIZER	0.2250E 00	114.0 AS	130	0.00000E 00	0.00000E 00
2	SEED	0.2000E 00	198.9 AS	14	0.00000E 00	0.00000E 00
3	HERBICIDES	0.2250E 00	96.6 SCB	131	0.00000E 00	0.00000E 00
4	MACH REPAIR	0.1580E 00	144.0 AS	340	0.00000E 00	0.00000E 00
5	LABOR	0.4500E 00	157.0 AS	0	0.00000E 00	0.95000E-04
6	DEPRECIATION	0.7500E-01	154.0 AS	358	0.00000E 00	0.00000E 00
7	MACH DEP	0.3250E 00	144.0 AS	358	0.00000E 00	0.00000E 00
8	TAXES	0.3000E 00	156.0 AS	0	0.00000E 00	0.00000E 00
9	INTEREST	0.1350E 01	179.0 AS	333	0.00000E 00	0.00000E 00
10	ELECT	0.2500E-01	129.3 SCB	4	0.38785E 04	0.00000E 00
11	DISEL FUEL	0.6800E-01	128.7 SCB	3	0.41411E 05	0.00000E 00
12	GASOLINE	0.4500E-01	128.7 SCB	3	0.16701E 05	0.00000E 00
13	AUTO GAS	0.1730E-01	128.7 SCB	3	0.64205E 04	0.00000E 00
14	AUTO OH	0.5800E-02	135.0 AS	286	0.00000E 00	0.00000E 00
15	DISEL FUEL--MH	0.3000E-02	128.7 SCB	3	0.18269E 04	0.00000E 00
16	LABOR--MH	0.9000E-02	157.0 AS	0	0.00000E 00	0.19000E-05
17	REPAIRS--MH	0.1800E-01	144.0 AS	340	0.00000E 00	0.00000E 00
18	MISC	0.7700E-01	146.0 AS	0	0.00000E 00	0.00000E 00
19	PROFIT	0.2023E 01	100.0 ---	0	0.00000E 00	0.00000E 00
20	TRANS TO ELEV	0.5100E-01	100.0 ---	361	0.18240E 04	0.00000E 00

TABLE B

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	GRAIN HANDLING & STORAGE (BU)					
21	DEPRECIATION	0.5098E-01	125.9 SCB	358	0.00000E 00	0.00000E 00
22	INSURANCE	0.1271E-01	137.7 ERD	335	0.00000E 00	0.00000E 00
23	TAXES	0.1449E-01	156.0 AS	0	0.00000E 00	0.00000E 00
24	LICENSES & BONDS	0.1550E-02	100.0 ---	0	0.00000E 00	0.00000E 00
25	INTEREST	0.6295E-01	179.0 AS	333	0.00000E 00	0.00000E 00
26	LABOR	0.2940E-01	157.0 AS	0	0.00000E 00	0.62060E-05
27	ADMIN. OH	0.2100E-01	131.2 SCB	342	0.00000E 00	0.00000E 00
28	TRUCK EXPENSE	0.2700E-02	121.8 AS	322	0.00000E 00	0.00000E 00
29	BUILDING REPAIRS	0.5900E-02	154.0 AS	29	0.00000E 00	0.00000E 00
30	EQUIP REPAIRS	0.3800E-02	144.0 AS	342	0.00000E 00	0.00000E 00
31	FUMIGATION	0.1500E-02	145.0 AS	342	0.00000E 00	0.00000E 00
32	ELECT	0.2800E-02	129.3 SCB	4	0.43439E 03	0.00000E 00
33	MISC	0.7400E-02	145.0 AS	0	0.00000E 00	0.00000E 00
34	TRANS TO PROCESS	0.3000E 00	100.0 ---	361	0.82800E 04	0.00000E 00

TABLE C

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	OIL EXTRACTION (BU)					
35	LABOR	0.3440E-01	145.1 MTS	0	0.00000E 00	0.44910E-05
36	SUPPLIES	0.5400E-02	108.3 ERD	138	0.00000E 00	0.00000E 00
37	HEXANE	0.7200E-02	128.7 SCB	3	0.37880E 04	0.00000E 00
38	REPAIRS	0.3160E-01	130.1 HLS	244	0.00000E 00	0.00000E 00
39	DEPRECIATION	0.1900E-01	154.4 SCB	358	0.00000E 00	0.00000E 00
40	INSURANCE	0.1400E-02	137.3 ERD	335	0.00000E 00	0.00000E 00
41	TAXES	0.7700E-02	131.2 SCB	0	0.00000E 00	0.00000E 00
42	MILL SUPERVISION	0.1570E-01	100.0 ---	0	0.00000E 00	0.00000E 00
43	ADMIN OH	0.2860E-01	123.5 ERD	342	0.00000E 00	0.00000E 00
44	SALARIES	0.1110E-01	100.0 ---	0	0.00000E 00	0.00000E 00
45	INTEREST	0.2060E-01	135.0 MTS	333	0.00000E 00	0.00000E 00
46	NATURAL GAS	0.3370E-01	126.7 SCB	5	0.41150E 05	0.00000E 00
47	ELECT	0.1710E-01	129.3 SCB	4	0.53810E 04	0.00000E 00
48	FUEL OIL	0.7800E-02	128.7 SCB	3	0.47500E 04	0.00000E 00
49	PROPANE	0.4460E-03	123.7 SCB	3	0.45000E 03	0.00000E 00

TABLE D1

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	TEXTURING (KG UNPACK)					
55	EQUIP DEP	0.1070E-01	121.7 SCB	358	0.00000E 00	0.00000E 00
56	EQUIP MAINTENANCE	0.9000E-03	121.7 SCB	342	0.00000E 00	0.00000E 00
57	INTEREST	0.1470E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
58	BUILDING DEP	0.2700E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
59	INSURANCE	0.7000E-03	137.3 ERD	335	0.00000E 00	0.00000E 00
60	BUILD.MAINT.	0.5000E-03	154.4 SCB	28	0.00000E 00	0.00000E 00
61	WATER	0.2000E-03	125.2 ERD	329	0.00000E 00	0.00000E 00
62	PACK-50# BAGS	0.8820E-02	119.5 ERD	119	0.00000E 00	0.00000E 00
63	ELECT	0.4820E-02	129.3 SCB	4	0.74700E 03	0.00000E 00
64	GAS	0.1000E-03	126.7 SCB	5	0.20000E 03	0.00000E 00
65	FUEL OIL	0.1200E-03	128.7 SCB	3	0.73000E 02	0.00000E 00
66	NAT.GAS-STEAM	0.6585E-03	126.7 SCB	5	0.13170E 04	0.00000E 00
67	FUEL OIL-STEAM	0.5400E-03	128.7 SCB	3	0.32900E 03	0.00000E 00
68	LABOR	0.2328E-01	145.1 MTS	0	0.00000E 00	0.30390E-05
69	TRANS TO PACK	0.7500E-01	121.8 ERD	322	0.00000E 00	0.00000E 00
70	PROFIT	0.9040E-01	100.0 ---	0	0.00000E 00	0.00000E 00

TABLE D2

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
UNITEX		(KG UNPACK)				
55	EQUIP DEP	0.3390E-01	121.7 SCB	358	0.00000E 00	0.00000E 00
56	EQUIP MAINT	0.1300E-02	121.7 SCB	342	0.00000E 00	0.00000E 00
57	INTEREST	0.4800E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
58	BUILDING DEP	0.7000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
59	INSURANCE	0.1100E-02	137.3 ERD	335	0.00000E 00	0.00000E 00
60	WATER	0.6000E-03	125.2 ERD	329	0.00000E 00	0.00000E 00
61	PACK-50LB BAGS	0.8800E-02	119.5 ERD	119	0.00000E 00	0.00000E 00
62	FLAVORING	0.1380E-01	142.2 ERD	59	0.00000E 00	0.00000E 00
63	LABOR	0.4259E-01	145.1 MTS	0	0.00000E 00	0.55600E-05
64	BUILD. MAINT	0.6500E-02	154.4 SCB	28	0.00000E 00	0.00000E 00
65	GAS	0.3000E-03	126.7 SCB	5	0.60000E 03	0.00000E 00
66	ELECT	0.8580E-02	129.3 SCB	4	0.13311E 04	0.00000E 00
67	OIL	0.3291E-03	128.7 SCB	3	0.20060E 03	0.00000E 00
68	STEAM-GAS	0.3115E-03	126.7 SCB	5	0.62300E 03	0.00000E 00
69	STEAM-OIL	0.4084E-02	128.7 SCB	3	0.24900E 04	0.00000E 00
70	PROFIT	0.5500E-01	100.0 ---	0	0.00000E 00	0.00000E 00

TABLE E

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
PACKAGING		(LB PACK)				
71	PAPER	0.3000E-01	119.5 ERD	117	0.00000E 00	0.00000E 00
72	ALUMINUM	0.3240E-02	124.8 ERD	186	0.00000E 00	0.00000E 00
73	ASSEMBLY	0.0000E 00	100.0 ---	360	0.36130E 04	0.00000E 00
74	SHIPPING CASE	0.8930E-02	124.6 ERD	120	0.00000E 00	0.00000E 00
75	TRANS TO WHSLER	0.3400E-01	121.8 ERD	322	0.00000E 00	0.00000E 00
76	PROFIT	0.7320E-01	100.0 ---	0	0.00000E 00	0.00000E 00

TABLE F

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	WHOLESALING	(LB PACK)				
77	LABOR	0.1780E-01	145.9 MTS	0	0.00000E 00	0.22910E-05
78	DEPRECIATION	0.1600E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
79	RENT	0.1400E-02	100.0 ---	0	0.00000E 00	0.00000E 00
80	EQUIP.COSTS	0.1800E-02	127.0 MTS	231	0.00000E 00	0.00000E 00
81	INTEREST	0.1200E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
82	ADVERTISING	0.3000E-03	178.9 SCB	343	0.00000E 00	0.00000E 00
83	INSURANCE	0.7000E-03	146.0 MTS	335	0.00000E 00	0.00000E 00
84	OTHER	0.5200E-02	135.0 MTS	342	0.00000E 00	0.00000E 00
85	COAL	0.5700E-05	213.1 SCB	1	0.18102E 02	0.00000E 00
86	REFINED	0.3280E-03	128.7 SCB	3	0.19996E 03	0.00000E 00
87	ELECT	0.3240E-03	129.3 SCB	4	0.50250E 02	0.00000E 00
88	GAS	0.4230E-04	126.7 SCB	5	0.44530E 02	0.00000E 00
89	TRANS TO RETAIL	0.5400E-02	121.8 ERD	322	0.00000E 00	0.00000E 00

TABLE G

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	RETAILING	(LB PACK)				
90	LABOR	0.4480E-01	146.6 MTS	0	0.00000E 00	0.68500E-05
91	PACKAGING	0.2800E-02	123.0 MTS	120	0.00000E 00	0.00000E 00
92	REPAIRS	0.1500E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
93	DEPRECIATION	0.2200E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
94	TAXES	0.3100E-02	131.2 SCB	0	0.00000E 00	0.00000E 00
95	RENT	0.8000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
96	INTEREST	0.1800E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
97	ADVERTISING	0.8700E-02	178.9 SCB	343	0.00000E 00	0.00000E 00
98	OTHER	0.8900E-02	135.0 MTS	342	0.00000E 00	0.00000E 00
99	PROFIT	0.5700E-02	63.6 MTS	0	0.00000E 00	0.00000E 00
100	REFINED	0.5020E-03	128.7 SCB	3	0.30603E 03	0.00000E 00
101	ELECT	0.1130E-02	129.3 SCB	4	0.17531E 03	0.00000E 00
102	GAS	0.2700E-03	126.7 SCB	5	0.28430E 03	0.00000E 00
103	UNALLOCATED PROFIT	0.8680E-01	100.0 ---	0	0.00000E 00	0.00000E 00

TABLE H

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	HOME PREPARATION (LB PACK)					
104	TRANS.	0.8100E-02	123.8 SCB	359	0.12382E 04	0.66090E-06
105	GAS STOVE-DIR	0.1891E-02	100.0 ---	5	0.15124E 04	0.00000E 00
106	GAS STOVE-CAP	0.3708E-02	110.3 HLS	262	0.00000E 00	0.00000E 00
107	ELECT STOVE-DIR	0.8740E-02	100.0 ---	4	0.13560E 04	0.00000E 00
108	ELECT STOVE-CAP	0.4585E-02	110.3 HLS	262	0.00000E 00	0.00000E 00

TABLE I

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	PACKAGING (LB)					
35	HEATING-OIL	0.1211E-04	128.7 SCB	3	0.73800E 01	0.00000E 00
36	HEATING-GAS	0.3690E-05	126.7 SCB	5	0.73800E 01	0.00000E 00
37	LIGHTING	0.2134E-03	129.3 SCB	4	0.33100E 02	0.00000E 00
38	MACHINARY-ELECT	0.8740E-04	129.3 SCB	4	0.13560E 02	0.00000E 00
39	MATERIALS-POLY	0.2054E-02	90.4 ERD	133	0.00000E 00	0.00000E 00
40	DEPRECIATION	0.1066E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
41	SHIPPING CARTON	0.3300E-02	124.6 ERD	120	0.00000E 00	0.00000E 00
42	LABOR	0.1000E 00	100.0 ---	0	0.00000E 00	0.12500E-04
43	RESID PROFIT	0.7750E-01	100.0 ---	0	0.00000E 00	0.00000E 00
44	TRANS TO WHOLS	0.3400E-01	121.8 ERD	322	0.00000E 00	0.00000E 00

TABLE J

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	WHOLESALING (LB)					
45	LABOR	0.1350E-01	145.9 MTS	0	0.00000E 00	0.17400E-05
46	DEP	0.1200E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
47	RENT	0.1000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
48	EQUIP COSTS	0.1400E-02	127.0 MTS	231	0.00000E 00	0.00000E 00
49	INTEREST	0.9000E-03	135.0 MTS	333	0.00000E 00	0.00000E 00
50	ADVERTISING	0.3000E-03	178.9 SCB	343	0.00000E 00	0.00000E 00
51	INSURANCE	0.5000E-03	146.0 MTS	335	0.00000E 00	0.00000E 00
52	OTHER	0.3900E-02	135.0 MTS	342	0.00000E 00	0.00000E 00
53	COAL	0.4890E-05	218.1 SCB	1	0.15530E 02	0.00000E 00
54	REFINED	0.2810E-03	128.7 SCB	3	0.17131E 03	0.00000E 00
55	ELECT	0.2780E-03	129.3 SCB	4	0.43129E 02	0.00000E 00
56	GAS	0.3630E-04	126.7 SCB	5	0.38210E 02	0.00000E 00
57	TRANS TO RETAIL	0.5400E-02	121.8 ERD	322	0.00000E 00	0.00000E 00

TABLE K

DATA #	INPUT NAME	$ COST (LB)	DEFLATOR	I/O#	BTUS	JOBS
	RETAILING					
58	LABOR	0.3383E-01	146.6 MTS	0	0.00000E 00	0.51730E-05
59	PACKAGING	0.2130E-02	123.0 MTS	120	0.00000E 00	0.00000E 00
60	REPAIRS	0.1120E-02	123.0 MTS	342	0.00000E 00	0.00000E 00
61	DEP	0.1660E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
62	BUSINESS TAXES	0.2380E-02	131.2 SCB	0	0.00000E 00	0.00000E 00
63	RENT	0.6050E-02	100.0 ---	0	0.00000E 00	0.00000E 00
64	INTEREST	0.6500E-03	135.0 MTS	333	0.00000E 00	0.00000E 00
65	ADVERTISING	0.6590E-02	178.9 SCB	343	0.00000E 00	0.00000E 00
66	OTHER	0.6740E-02	135.0 MTS	342	0.00000E 00	0.00000E 00
67	PROFIT	0.4290E-02	63.6 MTS	0	0.00000E 00	0.00000E 00
68	ELECT	0.8370E-03	129.3 SCB	4	0.12985E 03	0.00000E 00
69	REFINED	0.3730E-03	128.7 SCB	3	0.22739E 03	0.00000E 00
70	GAS	0.2010E-03	126.7 SCB	5	0.21160E 03	0.00000E 00

TABLE L

DATA #	INPUT NAME	$ COST (LB)	DEFLATOR	I/O#	BTUS	JOBS
	HOME					
71	TRANS.	0.8100E-02	123.8 SCB	359	0.12382E 04	0.66090E-06
72	GAS STOVE-DIR	0.3033E-02	100.0 ---	5	0.24263E 04	0.00000E 00
73	GAS STOVE-CAP	0.1810E-02	110.3 HLS	262	0.00000E 00	0.00000E 00
74	ELECT STOVE-DIR	0.2200E-01	100.0 ---	4	0.17753E 04	0.00000E 00
75	ELECT STOVE-CAP	0.2237E-02	110.3 HLS	262	0.00000E 00	0.00000E 00

TABLE M1

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	CORNBELT COWCALF (HD)					
1	NATIVE PASTURE	0.5820E 01	183.6 SCB	0	0.00000E 00	0.00000E 00
2	TAME PASTURE	0.1953E 02	183.6 SCB	10	0.00000E 00	0.00000E 00
3	ROT. MEADOW	0.8390E 01	183.6 SCB	10	0.00000E 00	0.00000E 00
4	NEW SEEDING	0.1840E 01	183.6 SCB	10	0.00000E 00	0.00000E 00
5	MIXED HAY	0.3590E 02	183.6 SCB	10	0.00000E 00	0.00000E 00
6	SALT & MIN.	0.9500E 00	127.9 SCB	22	0.00000E 00	0.00000E 00
7	PROTEIN FEED	0.2990E 01	183.6 SCB	10	0.00000E 00	0.00000E 00
8	VET MED	0.1850E 01	104.3 SCB	137	0.00000E 00	0.00000E 00
9	HAULING	0.3050E 01	142.0 SCB	322	0.00000E 00	0.00000E 00
10	MARKETING COMM.	0.1140E 01	150.1 SCB	0	0.00000E 00	0.00000E 00
11	GASOLINE	0.4800E 00	128.7 SCB	3	0.17814E 06	0.00000E 00
12	DISEL FUEL	0.7200E 00	128.7 SCB	3	0.43847E 06	0.00000E 00
13	LUBRICANTS	0.1800E 00	128.7 SCB	3	0.12986E 05	0.00000E 00
14	MACH. REPAIR	0.7000E 00	123.5 SCB	342	0.00000E 00	0.00000E 00
15	EQUIP. REPAIR	0.1310E 01	123.5 SCB	342	0.00000E 00	0.00000E 00
16	MACH. LABOR	0.3390E 01	157.0 AS	0	0.00000E 00	0.71560E-03
17	MANAGEMENT	0.1458E 02	157.0 AS	0	0.00000E 00	0.12870E-02
18	LIVESTOCK LABOR	0.3481E 02	157.0 AS	0	0.00000E 00	0.73490E-02
19	INTEREST ON CAP.	0.5430E 01	179.0 AS	333	0.00000E 00	0.00000E 00
20	LIVESTOCK DEP.	0.2810E 01	190.4 SCB	8	0.00000E 00	0.00000E 00
21	DEPRECIATION	0.1438E 02	125.9 SBC	358	0.00000E 00	0.00000E 00
22	INTEREST ON L.M.&E	0.5445E 02	179.0 AS	333	0.00000E 00	0.00000E 00
23	MISC	0.8580E 01	145.0 AS	0	0.00000E 00	0.00000E 00

TABLE M2

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	TEXAS COWCALF (HD)					
1	LEGUME HAY	0.2110E 01	183.6 SCB	10	0.00000E 00	0.00000E 00
2	PROTEIN FEED	0.1533E 02	183.6 SCB	10	0.00000E 00	0.00000E 00
3	SALT & MIN.	0.7200E 00	96.6 SCB	22	0.00000E 00	0.00000E 00
4	VET MED	0.3050E 01	104.3 SCB	137	0.00000E 00	0.00000E 00
5	SALE COMM.	0.4700E 00	150.1 SCB	0	0.00000E 00	0.00000E 00
6	ELECT	0.1070E 01	129.3 SCB	4	0.16600E 06	0.00000E 00
7	NATURAL GAS	0.3700E 00	126.7 SCB	5	0.38950E 05	0.00000E 00
8	GASOLINE	0.1010E 01	128.7 SCB	3	0.37484E 06	0.00000E 00
9	LUBRICANTS	0.1300E 00	128.7 SCB	3	0.93786E 04	0.00000E 00
10	MACH. REPAIR	0.3700E 00	125.9 SCB	342	0.00000E 00	0.00000E 00
11	EQUIP. REPAIR	0.5930E 01	125.9 SCB	342	0.00000E 00	0.00000E 00
12	MACH. LABOR	0.3860E 01	157.0 AS	0	0.00000E 00	0.81490E-03
13	LIVESTOCK LABOR	0.7000E-01	157.0 AS	0	0.00000E 00	0.14780E-04
14	INTEREST ON OP.CAP	0.1160E 01	179.0 AS	333	0.00000E 00	0.00000E 00
15	MANAGEMENT CHG.	0.6054E 01	157.0 AS	0	0.00000E 00	0.53420E-03
16	DEPRECIATION	0.1127E 02	125.9 SCB	358	0.00000E 00	0.00000E 00
17	LIVESTOCK DEP.	0.4270E 01	190.4 SCB	8	0.00000E 00	0.00000E 00
18	TAXES	0.2880E 01	156.0 AS	0	0.00000E 00	0.00000E 00
19	INTEREST	0.5459E 02	179.0 AS	333	0.00000E 00	0.00000E 00
20	INSURANCE	0.1320E 01	137.3 ERD	335	0.00000E 00	0.00000E 00
21	RESIDUAL LAND CHG	0.1178E 03	100.0	---	0	0.00000E 00	0.00000E 00

TABLE M3

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	INTERMOUTAIN COWCALF (HD)					
1	GRASS HAY	0.2136E 02	183.6 SCB	10	0.00000E 00	0.00000E 00
2	LEGUME HAY	0.2403E 02	183.6 SCB	10	0.00000E 00	0.00000E 00
3	PASTURE	0.7700E 01	183.6 SCB	338	0.00000E 00	0.00000E 00
4	PUB. GRAZING	0.9330E 01	183.6 SCB	338	0.00000E 00	0.00000E 00
5	PROTEIN SUPP.	0.2240E 01	183.6 SCB	10	0.00000E 00	0.00000E 00
6	SALT & MIN.	0.1610E 01	96.6 SCB	22	0.00000E 00	0.00000E 00
7	VET. MED	0.1550E 01	104.3 SCB	137	0.00000E 00	0.00000E 00
8	MACH. REPAIR	0.2386E 01	125.9 SCB	342	0.00000E 00	0.00000E 00
9	EQUIP. REPAIR	0.8200E 00	125.9 SCB	342	0.00000E 00	0.00000E 00
10	MACH. LABOR	0.9790E 01	157.0 AS	0	0.00000E 00	0.20670E-02
11	EQUIP. LABOR	0.1300E 00	157.0 AS	0	0.00000E 00	0.27440E-04
12	LIVESTOCK LABOR	0.1704E 02	157.0 AS	0	0.00000E 00	0.35970E-02
13	INTEREST	0.5510E 01	179.0 AS	333	0.00000E 00	0.00000E 00
14	GASOLINE	0.1720E 01	128.7 SCB	3	0.63834E 06	0.00000E 00
15	DISEL FUEL	0.4460E 01	128.7 SCB	3	0.27161E 06	0.00000E 00
16	LUBRICANTS	0.1120E 01	128.7 SCB	3	0.80800E 05	0.00000E 00
17	TAXES	0.3770E 01	156.0 AS	0	0.00000E 00	0.00000E 00
18	DEP. ON LIVESTOCK	0.1244E 02	190.4 SCB	8	0.00000E 00	0.00000E 00
19	DEPRECIATION	0.7660E 01	125.9 SCB	358	0.00000E 00	0.00000E 00
20	INTEREST	0.4774E 02	179.0 AS	333	0.00000E 00	0.00000E 00
21	INSURANCE	0.1380E 01	137.3 ERD	335	0.00000E 00	0.00000E 00
22	MANAGE. CHARGE	0.4370E 01	157.0 AS	0	0.00000E 00	0.38560E-03
23	HAULING	0.5910E 01	142.0 SCB	322	0.00000E 00	0.00000E 00
24	MARKETING	0.2200E 01	150.1 SCB	0	0.00000E 00	0.00000E 00
25	MISC	0.3150E 01	145.0 AS	0	0.00000E 00	0.00000E 00

TABLE N1

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	CORNBELT FEEDLOT (HD)					
24	TRANS. TO LOT	0.4560E 01	146.0 AS	322	0.00000E 00	0.00000E 00
25	CORN	0.9295E 02	153.1 HLS	10	0.00000E 00	0.00000E 00
26	SILAGE	0.2614E 02	153.1 HLS	10	0.00000E 00	0.00000E 00
27	PROTEIN SUPP.	0.2964E 02	211.9 HLS	10	0.00000E 00	0.00000E 00
28	HAY	0.6110E 01	243.3 HLS	10	0.00000E 00	0.00000E 00
29	LABOR	0.8440E 01	157.0 AS	0	0.00000E 00	0.17820E-02
30	MANAGEMENT	0.4220E 01	157.0 AS	0	0.00000E 00	0.37240E-03
31	VET MED	0.2320E 01	104.1 HLS	137	0.00000E 00	0.00000E 00
32	INTEREST	0.1370E 02	179.0 AS	333	0.00000E 00	0.00000E 00
33	DEATH LOSS	0.3220E 01	188.9 HLS	8	0.00000E 00	0.00000E 00
34	ELECT	0.7700E 00	128.1 HLS	4	0.11940E 06	0.00000E 00
35	DISEL FUEL	0.1460E 01	125.1 HLS	3	0.88911E 06	0.00000E 00
36	GASOLINE	0.8400E 00	125.1 HLS	3	0.31175E 06	0.00000E 00
37	DEPRECIATION	0.7650E 01	154.0 AS	358	0.00000E 00	0.00000E 00
38	MARKETING COMM.	0.3200E 01	150.1 AS	0	0.00000E 00	0.00000E 00

TABLE N2

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	TEXAS FEEDLOT (HD)					
22	TRANS. TO LOT	0.1710E 01	146.0 AS	322	0.00000E 00	0.00000E 00
23	MARKETING COMM.	0.3000E 01	150.1 AS	0	0.00000E 00	0.00000E 00
24	SORGHUM GRAIN	0.8144E 02	153.1 HLS	10	0.00000E 00	0.00000E 00
25	CORN	0.4393E 02	153.1 HLS	10	0.00000E 00	0.00000E 00
26	UREA	0.1110E 01	94.7 HLS	130	0.00000E 00	0.00000E 00
27	COTTONSEED HULLS	0.5860E 01	153.1 HLS	60	0.00000E 00	0.00000E 00
28	ALFALFA CUBES	0.2418E 02	243.3 HLS	10	0.00000E 00	0.00000E 00
29	LABOR	0.3400E 01	157.0 AS	0	0.00000E 00	0.71780E-03
30	MANAGEMENT	0.3400E 01	157.0 AS	0	0.00000E 00	0.30000E-03
31	VET MED	0.2320E 01	104.1 HLS	137	0.00000E 00	0.00000E 00
32	INTEREST	0.1066E 02	179.0 AS	333	0.00000E 00	0.00000E 00
33	ELECT	0.1570E 01	128.1 SCB	4	0.24357E 06	0.00000E 00
34	GASOLINE	0.1320E 01	125.1 HLS	3	0.48989E 06	0.00000E 00
35	LUBRICANTS	0.2000E 00	125.1 HLS	3	0.14429E 05	0.00000E 00
36	DEPRECIATION	0.4150E 01	154.0 AS	358	0.00000E 00	0.00000E 00
37	R&M FEED MILL	0.6600E 00	125.0 HLS	342	0.00000E 00	0.00000E 00
38	R&M AUTO	0.3300E 00	119.0 HLS	345	0.00000E 00	0.00000E 00
39	R&M BUILDINGS	0.1720E 01	154.0 AS	29	0.00000E 00	0.00000E 00
40	TELEPHONE	0.7500E 00	116.5 HLS	327	0.00000E 00	0.00000E 00
41	DEATH LOSS	0.5310E 01	188.9 HLS	8	0.00000E 00	0.00000E 00
42	MISC	0.4640E 01	133.2 HLS	0	0.00000E 00	0.00000E 00
	MEAT PACKING (RET LB)					

TABLE N3

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	CALIF FEEDLOT (HD)					
26	TRANS. TO LOT	0.1197E 02	146.0 AS	322	0.00000E 00	0.00000E 00
27	COMMISION	0.2250E 01	150.1 AS	0	0.00000E 00	0.00000E 00
28	BARLEY	0.1211E 03	153.1 HLS	10	0.00000E 00	0.00000E 00
29	COTTONSEED MEAL	0.6240E 01	153.1 HLS	60	0.00000E 00	0.00000E 00
30	UREA	0.1360E 01	94.7 HLS	130	0.00000E 00	0.00000E 00
31	ALFALFA HAY	0.1832E 02	243.3 HLS	10	0.00000E 00	0.00000E 00
32	LABOR	0.4280E 01	157.0 AS	0	0.00000E 00	0.90350E-03
33	MANAGE. LABOR	0.4280E 01	157.0 AS	0	0.00000E 00	0.37770E-03
34	VET. MED	0.2320E 01	104.1 HLS	137	0.00000E 00	0.00000E 00
35	INTEREST	0.1692E 02	179.0 AS	333	0.00000E 00	0.00000E 00
36	GASOLINE	0.1320E 01	125.1 HLS	3	0.48989E 06	0.00000E 00
37	LUBRICANTS	0.2000E 00	125.1 HLS	3	0.14429E 05	0.00000E 00
38	ELECT	0.1570E 01	128.1 HLS	4	0.24357E 06	0.00000E 00
39	DEPRECIATION	0.4150E 01	154.0 AS	358	0.00000E 00	0.00000E 00
40	R&M FEED MILL	0.6600E 00	125.0 HLS	342	0.00000E 00	0.00000E 00
41	R&M AUTO	0.3300E 00	119.0 HLS	345	0.00000E 00	0.00000E 00
42	R&M BUILDINGS	0.1720E 01	154.0 AS	29	0.00000E 00	0.00000E 00
43	TELEPHONE	0.7500E 00	116.5 HLS	327	0.00000E 00	0.00000E 00
44	DEATH LOSS	0.5310E 01	188.9 HLS	8	0.00000E 00	0.00000E 00
45	MISC	0.4640E 01	133.2 HLS	0	0.00000E 00	0.00000E 00

TABLE 01

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	MEAT PACKING	(RET LB)				
40	LABOR	0.1500E-01	145.1 MTS	0	0.00000E 00	0.19590E-05
41	PACKAGING	0.2000E-02	123.0 MTS	120	0.00000E 00	0.00000E 00
42	TRANS.	0.6000E-02	163.4 SCB	322	0.00000E 00	0.00000E 00
43	BUSINESS TAXES	0.1000E-02	131.2 SCB	0	0.00000E 00	0.00000E 00
44	DEPRECIATION	0.3000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
45	RENT	0.2000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
46	REPAIRS	0.2000E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
47	ADVERTISING	0.1000E-02	178.9 SCB	343	0.00000E 00	0.00000E 00
48	INTEREST	0.3000E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
49	PROFIT	0.5000E-02	120.0 MTS	0	0.00000E 00	0.00000E 00
50	COAL	0.2741E-03	218.1 SCB	1	0.87050E 03	0.00000E 00
51	FUEL OIL	0.1539E-03	128.7 SCB	3	0.93790E 02	0.00000E 00
52	GAS	0.4544E-03	126.7 SCB	5	0.90880E 03	0.00000E 00
53	ELECT.	0.1118E-02	129.3 SCB	4	0.17340E 03	0.00000E 00
54	OTHER	0.1600E-01	135.0 MTS	342	0.00000E 00	0.00000E 00

TABLE 02

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	MEAT PACKING	(RET LB)				
43	LABOR	0.1500E-01	145.1 MTS	0	0.00000E 00	0.19580E-05
44	PACKAGING	0.2000E-02	123.0 MTS	120	0.00000E 00	0.00000E 00
45	TRANS.	0.6000E-02	163.4 SCB	322	0.00000E 00	0.00000E 00
46	BUSINESS TAXES	0.1000E-02	131.2 SCB	0	0.00000E 00	0.00000E 00
47	DEPRECIATION	0.3000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
48	RENT	0.2000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
49	REPAIRS	0.2000E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
50	ADVERTISING	0.1000E-02	178.9 SCB	343	0.00000E 00	0.00000E 00
51	INTEREST	0.3000E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
52	PROFIT	0.5000E-02	120.0 MTS	0	0.00000E 00	0.00000E 00
53	COAL	0.2741E-03	218.1 SCB	1	0.87050E 03	0.00000E 00
54	FUEL OIL	0.1539E-03	128.7 SCB	3	0.93790E 02	0.00000E 00
55	GAS	0.4544E-03	126.7 SCB	5	0.90880E 03	0.00000E 00
56	ELECT.	0.1118E-02	129.3 SCB	4	0.17340E 03	0.00000E 00
57	OTHER	0.1600E-01	135.0 MTS	342	0.00000E 00	0.00000E 00

TABLE 03

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	MEAT PACKING	(RET LB)				
46	LABOR	0.1500E-01	145.1 MTS	0	0.00000E 00	0.19580E-05
47	PACKAGING	0.2000E-02	123.0 MTS	120	0.00000E 00	0.00000E 00
48	TRANS.	0.6000E-02	163.4 SCB	322	0.00000E 00	0.00000E 00
49	BUSINESS TAXES	0.1000E-02	131.2 SCB	0	0.00000E 00	0.00000E 00
50	DEPRECIATION	0.3000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
51	RENT	0.2000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
52	REPAIRS	0.2000E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
53	ADVERTISING	0.1000E-02	178.9 SCB	343	0.00000E 00	0.00000E 00
54	INTEREST	0.3000E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
55	PROFIT	0.5000E-02	120.0 MTS	0	0.00000E 00	0.00000E 00
56	COAL	0.2741E-03	218.1 SCB	1	0.87050E 03	0.00000E 00
57	FUEL OIL	0.1539E-03	128.7 SCB	3	0.93790E 02	0.00000E 00
58	GAS	0.4544E-03	126.7 SCB	5	0.90880E 03	0.00000E 00
59	ELECT.	0.1118E-02	129.3 SCB	4	0.17340E 03	0.00000E 00
60	OTHER	0.1600E-01	135.0 MTS	342	0.00000E 00	0.00000E 00

TABLE P1

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	WHOLESALING	(RET LB)				
55	TRANS. -INTERCITY	0.1100E-01	163.4 SCB	322	0.00000E 00	0.00000E 00
56	LABOR	0.4830E-01	145.9 MTS	0	0.00000E 00	0.62240E-05
57	DEPRECIATION	0.4400E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
58	RENT	0.3700E-02	100.0 ---	0	0.00000E 00	0.00000E 00
59	EQUIPMENT	0.4900E-02	127.0 MTS	251	0.00000E 00	0.00000E 00
60	INTEREST	0.3300E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
61	ADVERTISING	0.9000E-03	178.9 SCB	343	0.00000E 00	0.00000E 00
62	INSURANCE	0.1900E-02	146.0 MTS	335	0.00000E 00	0.00000E 00
63	OTHER	0.1410E-01	135.0 MTS	342	0.00000E 00	0.00000E 00
64	TRANS-INTRACITY	0.5400E-02	163.4 SCB	322	0.00000E 00	0.00000E 00
65	COAL	0.1650E-04	218.1 SCB	1	0.52401E 02	0.00000E 00
66	REFINED	0.9500E-03	128.7 SCB	3	0.57915E 03	0.00000E 00
67	ELECT	0.9410E-03	129.3 SCB	4	0.14599E 03	0.00000E 00
68	GAS	0.1230E-03	126.7 SCB	5	0.10530E 03	0.00000E 00

TABLE P2

DATA #	INPUT NAME	$ COST	DEFLATOR		I/O#	BTUS	JOBS
	WHOLESALING	(RET LB)					
58	TRANS. -INTERCITY	0.1100E-01	163.4	SCB	322	0.00000E 00	0.00000E 00
59	LABOR	0.4830E-01	145.9	MTS	0	0.00000E 00	0.62240E-05
60	DEPRECIATION	0.4400E-02	154.4	SCB	358	0.00000E 00	0.00000E 00
61	RENT	0.3700E-02	146.0	MTS	0	0.00000E 00	0.00000E 00
62	EQUIPMENT	0.4900E-02	127.0	MTS	251	0.00000E 00	0.00000E 00
63	INTEREST	0.3300E-02	135.0	MTS	333	0.00000E 00	0.00000E 00
64	ADVERTISING	0.9000E-03	178.9	SCB	343	0.00000E 00	0.00000E 00
65	INSURANCE	0.1900E-02	146.0	MTS	335	0.00000E 00	0.00000E 00
66	OTHER	0.1410E-01	135.0	MTS	342	0.00000E 00	0.00000E 00
67	TRANS-INTRACITY	0.5400E-02	163.4	SCB	322	0.00000E 00	0.00000E 00
68	COAL	0.1650E-04	218.1	SCB	1	0.52401E 02	0.00000E 00
69	REFINED	0.9500E-03	128.7	SCB	3	0.57915E 03	0.00000E 00
70	ELECT	0.9410E-03	129.3	SCB	4	0.14599E 03	0.00000E 00
71	GAS	0.1230E-03	126.7	SCB	5	0.10530E 03	0.00000E 00

TABLE P3

DATA #	INPUT NAME	$ COST	DEFLATOR		I/O#	BTUS	JOBS
	WHOLESALING	(RET LB)					
61	TRANS. -INTERCITY	0.1100E-01	163.4	SCB	322	0.00000E 00	0.00000E 00
62	LABOR	0.4830E-01	145.9	MTS	0	0.00000E 00	0.62240E-05
63	DEPRECIATION	0.4400E-02	154.4	SCB	358	0.00000E 00	0.00000E 00
64	RENT	0.3700E-02	100.0	---	0	0.00000E 00	0.00000E 00
65	EQUIPMENT	0.4900E-02	127.0	MTS	251	0.00000E 00	0.00000E 00
66	INTEREST	0.3300E-02	135.0	MTS	333	0.00000E 00	0.00000E 00
67	ADVERTISING	0.9000E-03	178.9	SCB	343	0.00000E 00	0.00000E 00
68	INSURANCE	0.1900E-02	146.0	MTS	335	0.00000E 00	0.00000E 00
69	OTHER	0.1410E-01	135.0	MTS	342	0.00000E 00	0.00000E 00
70	TRANS-INTRACITY	0.5400E-02	163.4	SCB	322	0.00000E 00	0.00000E 00
71	COAL	0.1650E-04	218.1	SCB	1	0.52401E 02	0.00000E 00
72	REFINED	0.9500E-03	128.7	SCB	3	0.57915E 03	0.00000E 00
73	ELECT	0.9410E-03	129.3	SCB	4	0.14599E 03	0.00000E 00
74	GAS	0.1230E-03	126.7	SCB	5	0.10530E 03	0.00000E 00

TABLE Q1

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	RETAILING (RET LB)					
69	LABOR	0.1590E 00	146.6 MTS	0	0.00000E 00	0.24310E-04
70	PACKAGING	0.2800E-01	123.0 MTS	120	0.00000E 00	0.00000E 00
71	BUS. TAXES	0.1000E-01	131.2 SCB	0	0.00000E 00	0.00000E 00
72	DEPRECIATION	0.5000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
73	RENT	0.7000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
74	REPAIRS	0.3000E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
75	ADVERTISING	0.2100E-01	178.8 SCB	343	0.00000E 00	0.00000E 00
76	INTEREST	0.2000E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
77	PROFIT	0.1700E-01	63.6 MTS	0	0.00000E 00	0.00000E 00
78	ELECT	0.3560E-02	129.3 SCB	4	0.55230E 03	0.00000E 00
79	REFINED	0.1590E-02	128.7 SCB	3	0.96931E 03	0.00000E 00
80	GAS	0.8540E-03	126.7 SCB	5	0.89890E 03	0.00000E 00
81	OTHER	0.2500E-01	135.0 MTS	342	0.00000E 00	0.00000E 00

TABLE Q2

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	RETAILING (RET LB)					
72	LABOR	0.1590E 00	146.6 MTS	0	0.00000E 00	0.24310E-04
73	PACKAGING	0.2800E-01	123.0 MTS	120	0.00000E 00	0.00000E 00
74	BUS. TAXES	0.1000E-01	131.2 SCB	0	0.00000E 00	0.00000E 00
75	DEPRECIATION	0.5000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
76	RENT	0.7000E-02	146.0 MTS	338	0.00000E 00	0.00000E 00
77	REPAIRS	0.3000E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
78	ADVERTISING	0.2100E-01	178.8 SCB	343	0.00000E 00	0.00000E 00
79	INTEREST	0.2000E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
80	PROFIT	0.1700E-01	63.6 MTS	0	0.00000E 00	0.00000E 00
81	ELECT	0.3560E-02	129.3 SCB	4	0.55230E 03	0.00000E 00
82	REFINED	0.1590E-02	128.7 SCB	3	0.96931E 03	0.00000E 00
83	GAS	0.8540E-03	126.7 SCB	5	0.89890E 03	0.00000E 00
84	OTHER	0.2500E-01	135.0 MTS	342	0.00000E 00	0.00000E 00

TABLE Q 3

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
	RETAILING (RET LB)					
75	LABOR	0.1590E 00	146.6 MTS	0	0.00000E 00	0.24310E-04
76	PACKAGING	0.2800E-01	123.0 MTS	120	0.00000E 00	0.00000E 00
77	BUS. TAXES	0.1000E-01	131.2 SCB	0	0.00000E 00	0.00000E 00
78	DEPRECIATION	0.5000E-02	154.4 SCB	358	0.00000E 00	0.00000E 00
79	RENT	0.7000E-02	100.0 ---	0	0.00000E 00	0.00000E 00
80	REPAIRS	0.3000E-02	146.0 MTS	342	0.00000E 00	0.00000E 00
81	ADVERTISING	0.2100E-01	178.8 SCB	343	0.00000E 00	0.00000E 00
82	INTEREST	0.2000E-02	135.0 MTS	333	0.00000E 00	0.00000E 00
83	PROFIT	0.1700E-01	63.6 MTS	0	0.00000E 00	0.00000E 00
84	ELECT	0.3560E-02	129.3 SCB	4	0.55230E 03	0.00000E 00
85	REFINED	0.1590E-02	128.7 SCB	3	0.96931E 03	0.00000E 00
86	GAS	0.8540E-03	126.7 SCB	5	0.89890E 03	0.00000E 00
87	OTHER	0.2500E-01	135.0 MTS	342	0.00000E 00	0.00000E 00

TABLE R1

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
HOME PREPARATION		(RET LB)				
82	TRANS.	0.8100E-02	123.8 SCB	359	0.12382E 04	0.66090E-06
83	REFRIDGE.-DIR	0.1646E-01	100.0 ---	4	0.25530E 04	0.00000E 00
84	REFRIDGE.-CAP	0.6149E-02	108.3 HLS	263	0.00000E 00	0.00000E 00
85	FREEZER-DIR	0.1070E-01	100.0 ---	4	0.10358E 04	0.00000E 00
86	FREEZER-CAP	0.1732E-02	108.3 HLS	263	0.00000E 00	0.00000E 00
87	GAS STOVE-DIR	0.1891E-02	100.0 ---	5	0.15124E 04	0.00000E 00
88	GAS STOVE-CAP	0.3708E-02	110.3 HLS	262	0.00000E 00	0.00000E 00
89	ELECT STOVE-DIR	0.8740E-02	100.0 ---	4	0.13560E 04	0.00000E 00
90	ELECT STOVE-CAP	0.4585E-02	110.3 HLS	262	0.00000E 00	0.00000E 00

TABLE R2

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
HOME PREPARATION		(RET LB)				
85	TRANS.	0.8100E-02	123.8 SCB	359	0.12382E 04	0.66090E-06
86	REFRIDGE.-DIR	0.1646E-01	100.0 ---	4	0.25530E 04	0.00000E 00
87	REFRIDGE.-CAP	0.6149E-02	108.3 HLS	263	0.00000E 00	0.00000E 00
88	FREEZER-DIR	0.1070E-01	100.0 ---	4	0.10358E 04	0.00000E 00
89	FREEZER-CAP	0.1732E-02	108.3 HLS	263	0.00000E 00	0.00000E 00
90	GAS STOVE-DIR	0.1891E-02	100.0 ---	5	0.15124E 04	0.00000E 00
91	GAS STOVE-CAP	0.3708E-02	110.3 HLS	262	0.00000E 00	0.00000E 00
92	ELECT STOVE-DIR	0.8740E-02	100.0 ---	4	0.13560E 04	0.00000E 00
93	ELECT STOVE-CAP	0.4585E-02	110.3 HLS	262	0.00000E 00	0.00000E 00

TABLE R3

DATA #	INPUT NAME	$ COST	DEFLATOR	I/O#	BTUS	JOBS
HOME PREPARATION		(RET LB)				
88	TRANS.	0.8100E-02	123.8 SCB	359	0.12382E 04	0.66090E-05
89	REFRIDGE.-DIR	0.1646E-01	100.0 ---	4	0.25530E 04	0.00000E 00
90	REFRIDGE.-CAP	0.6149E-02	108.3 HLS	263	0.00000E 00	0.00000E 00
91	FREEZER-DIR	0.1070E-01	100.0 ---	4	0.10358E 04	0.00000E 00
92	FREEZER-CAP	0.1732E-02	108.3 HLS	263	0.00000E 00	0.00000E 00
93	GAS STOVE-DIR	0.1891E-02	100.0 ---	5	0.15124E 04	0.00000E 00
94	GAS STOVE-CAP	0.3708E-02	110.3 HLS	262	0.00000E 00	0.00000E 00
95	ELECT STOVE-DIR	0.8740E-02	100.0 ---	4	0.13560E 04	0.00000E 00
96	ELECT STOVE-CAP	0.4585E-02	110.3 HLS	262	0.00000E 00	0.00000E 00

TABLE S

CORRESPONDENCE BETWEEN CENTER FOR ADVANCED COMPUTATION INPUT-OUTPUT #'s in TABLES A-R3, and BUREAU OF ECONOMIC ANALYSIS INPUT-OUTPUT NUMBERS (listed without decimal points).

1	700	52	1416	103	2202	154	3602	205	4102	256	5303	307	6303
2	800	53	1417	104	2203	155	3603	206	4201	257	5304	308	6401
3	3101	54	1418	105	2204	156	3604	207	4202	258	5305	309	6402
4	6801	55	1419	106	2301	157	3605	208	4203	259	5306	310	6403
5	6802	56	1420	107	2302	158	3606	209	4204	260	5307	311	6404
6	101	57	1421	108	2303	159	3607	210	4205	261	5308	312	6405
7	102	58	1422	109	2304	160	3608	211	4206	262	5401	313	6406
8	103	59	1423	110	2305	161	3609	212	4207	263	5402	314	6407
9	201	60	1424	111	2306	162	3610	213	4208	264	5403	315	6408
10	202	61	1425	112	2307	163	3611	214	4209	265	5404	316	6409
11	203	62	1426	113	2401	164	3612	215	4210	266	5405	317	6410
12	204	63	1427	114	2402	165	3613	216	4211	267	5406	318	6411
13	205	64	1428	115	2403	166	3614	217	4301	268	5407	319	6412
14	206	65	1429	116	2404	167	3615	218	4302	269	5501	320	6501
15	207	66	1430	117	2405	168	3616	219	4400	270	5502	321	6502
16	300	67	1431	118	2406	169	3617	220	4501	271	5503	322	6503
17	400	68	1432	119	2407	170	3618	221	4502	272	5601	323	6504
18	500	69	1501	120	2500	171	3619	222	4503	273	5602	324	6505
19	601	70	1502	121	2601	172	3620	223	4601	274	5603	325	6506
20	602	71	1601	122	2602	173	3621	224	4602	275	5604	326	6507
21	900	72	1602	123	2603	174	3622	225	4603	276	5701	327	6600
22	1000	73	1603	124	2604	175	3701	226	4604	277	5702	328	6700
23	1101	74	1604	125	2605	176	3702	227	4701	278	5703	329	6803
24	1102	75	1701	126	2606	177	3703	228	4702	279	5801	330	6901
25	1103	76	1702	127	2607	178	3704	229	4703	280	5802	331	6902
26	1104	77	1703	128	2608	179	3801	230	4704	281	5803	332	7001
27	1105	78	1704	129	2701	180	3802	231	4801	282	5804	333	7002
28	1201	79	1705	130	2702	181	3803	232	4802	283	5805	334	7003
29	1202	80	1706	131	2703	182	3804	233	4803	284	5901	335	7004
30	1301	81	1707	132	2704	183	3805	234	4804	285	5902	336	7005
31	1302	82	1708	133	2801	184	3806	235	4805	286	5903	337	7101
32	1303	83	1709	134	2802	185	3807	236	4806	287	6001	338	7102
33	1304	84	1710	135	2803	186	3808	237	4901	288	6002	339	7201
34	1305	85	1801	136	2804	187	3809	238	4902	289	6003	340	7202
35	1306	86	1802	137	2901	188	3810	239	4903	290	6004	341	7203
36	1307	87	1803	138	2902	189	3811	240	4904	291	6101	342	7301
37	1401	88	1804	139	2903	190	3812	241	4905	292	6102	343	7302
38	1402	89	1901	140	3000	191	3813	242	4906	293	6103	344	7303
39	1403	90	1902	141	3102	192	3814	243	4907	294	6104	345	7500
40	1404	91	1903	142	3103	193	3901	244	5000	295	6105	346	7601
41	1405	92	2001	143	3201	194	3902	245	5101	296	6106	347	7602
42	1406	93	2002	144	3202	195	4001	246	5102	297	6107	348	7701
43	1407	94	2003	145	3203	196	4002	247	5103	298	6201	349	7702
44	1408	95	2004	146	3204	197	4003	248	5104	299	6202	350	7703
45	1409	96	2005	147	3300	198	4004	249	5201	300	6203	351	7704
46	1410	97	2006	148	3401	199	4005	250	5202	301	6204	352	7705
47	1411	98	2007	149	3402	200	4006	251	5203	302	6205	353	7801
48	1412	99	2008	150	3403	201	4007	252	5204	303	6206	354	7804
49	1413	100	2009	151	3501	202	4008	253	5205	304	6207	355	7903
50	1414	101	2100	152	3502	203	4009	254	5301	305	6301	356	8100
51	1415	102	2201	153	3601	204	4101	255	5302	306	6302	357	8200

TABLE AA

REVISED MARKET BASKET; YEARLY CONSUMPTION PER HOUSEHOLD AND ASSUMPTION WHETHER REFRIGERATED (R) OR NOT REFRIGERATED (NR).

FOOD NAME	QUANTITY (lbs.)	REFRIGERATION ASSUMPTION
Beef	251.88	R
Veal	4.57	R
Pork	191.83	R
Lamb and Mutton	5.40	R
Milk, fresh	803.28	R
Milk, evaporated	51.08	NR
Cheese, American	42.62	R
Ice Cream	74.37	R
Butter	15.03	R
Watermelons	47.00	R
Oranges	105.47	R
Lemons	5.93	R
Grapefruit	26.60	R
Apples	73.72	R
Grapes	1.47	R
Strawberries	8.80	R
Chicken	147.12	R
Turkey	12.03	R
Eggs	116.18	R
Fruit Cocktail, canned	36.70	NR
Peaches, canned	75.17	NR
Pears, canned	25.95	NR
Orange Juice, chilled	72.28	R
Orange Juice, frozen	34.56	R
Carrots, fresh	26.75	R
Peppers, green	12.32	R
Spinach	2.58	R
Cabbage	35.65	R
Celery	32.18	R

TABLE AA (continued)

FOOD NAME	QUANTITY (lbs.)	REFRIGERATION ASSUMPTION
Cucumbers	11.90	R
Lettuce	79.36	R
Onions	36.69	R
Tomatoes, fresh	25.67	R
Tomatoes, canned	121.42	NR
Beets, canned	13.98	NR
Corn, canned	77.86	NR
Peas, canned	46.23	NR
Brocolli, frozen	16.78	R
Peas, frozen	18.48	R
Potatoes	230.04	NR
Beans, dried	13.05	NR
Flour, white	218.37	NR
Rice	37.33	NR
Corn Cereal (flakes)	49.61	NR
Canned Soups	60.66	NR
Sugar	63.35	NR
Margarine	66.60	R
Shortening, vegetable	33.95	NR
Salad and cooking oil (other)	26.55	NR
Bakery and Cereal, Misc.	353.37	NR
Processed fruits and fruit juices, Misc.	35.04	R
Processed vegetables, Misc.	41.21	R
Processed vegetables, Misc.	7.39	NR
Peanut Butter	11.09	NR
Grape Jelly	17.19	NR
Spaghetti, canned	95.12	NR

Σ R = 2481.35

Σ NR = 1665.46

REFERENCES

[1] "Agricultural Statistics, 1974," United States Department of Agriculture U. S. Government Printing Office, Washington, D. C., 1974, Table 191, p. 136.

[2] Lowell Hill, Department of Agricultural Economics, University of Illinoi at Urbana-Champaign, Urbana, Ill. based on a survey of a random sample of farmers as part of a study conducted by the North Central Research Committee, NC-104.

[3] James Suchodowsky, Wickes Agriculture, Saginaw, MI, various personal communications.

[4] Bill Bolster, Wickes Agriculture, Saginaw, MI, personal communication.

[5] Oak B. Smith, President, Wenger International, Inc., Kansas City, MO, personal communication.

[6] Richard Lebo, Eisner Food Stores, Champaign, IL, personal communication

[7] Mike Quade, Dean Foods, Franklin Park, IL., personal communication.

[8] Bullard, C. W., and Herendeen, R. A., "Energy Impact of Consumption Decisions," Proceedings of the Institute of Electrical & Electronics Engineers, Inc., Vol. 63, No. 3, p. 484.

[9] For a complete discussion see Herendeen, R.A., and Bullard, C.W., "Energy Cost of Goods and Services, 1963 and 1967," Document No. 140, Center for Advanced Computation, University of Illinois, Urbana, Ill., November 1974.

[10] Ibid, p. 16.

[11] Statistical Abstract of the U.S., 1974, U.S. Department of Commerce Bureau of the Census, Washington, D. C.

[12] Handbook of Labor Statistics, Indexes of Output per man-hour, Table 83, U.S. Dept. of Labor, Bureau of Labor Statistics, 1974.

[13] Livestock and Meat Situation #197, U.S.D.A. July, 1974.

[14] "Agricultural Statistics, 1974," United States Dept. of Agriculture, United States Government Printing Office, Washington, 1974, appropriate tables.

[15] For a discussion of the dual products problem, see Appendix D(1)(C). For land purposes, the allocation was made on the basis of total dollar value.

[16] "Amino Acid Content of Foods and Biological Data on Protein," FAO Nutrition Study No. 24, Food and Agriculture Organization of the United Nations, Rome, 1970, pp. 56, 116, 172, 179.

[17] ADM Corp., Decatur, IL, personal communication.

[18] Oak B. Smith, Wenger International, Inc., Kansas City, MO, personal communication. Data was not available in NPU terms, and so the PER value of 2.0 was converted to NPU by the following equation: NPU = 14.11 PER + 36.45. This computation comes from "Economics of Analogues and Extenders in Relation to Foods From Animal Sources," presented at American Institute of Chemical Engineers, Dec. 2, 1974, by Kermit Bird, Head, Nutrition Programs Group, Food and Nutrition Service, U.S.D.A., Washington, D. C.

[19] Prof. F. Van Duyne, Dept. of Home Economics, University of Illinois at Urbana-Champaign, Urbana, IL, personal communication.

[20] See Appendix D(1) for details of the allocation.

[21] Census of Manufactures, 1967, Bureau of the Census, U.S. Dept. of Commerce, Washington, D. C. 1970.

[22] Total dollar value of shipments divided by total quantity.

[23] According to CAC data, for Cooking Oils Sector, $\frac{\text{producer's price}}{\text{purchaser's price}} = .6521$.

[24] The inflator from 1967 to 1973 for dollar cost of soybean oil at the wholesale level was 1.916, calculated on the basis of average wholesale prices from reference 14.

[25] From BEA data on dollar transactions, wholesaling margin is 10% of purchase price and retailing is 24% of purchase price. These dollar amounts were then used in conjunction with the CAC Energy-Employment model to determine the energy and labor costs.

[26] Described in Section III-B.

[27] The costs, per pound of soybean oil, as used in this study, are as follows: dollar, $.487; energy, 12,765 Btu; labor, .35933E-04 man-year; land, .852E-03 acre. The amount of soybean oil needed to supply the calories associated with one pound of net utilizable protein are as follows: soybeans, 1.95 lbs. soybean oil; unitex and TSP, 1.10 lbs. soybean oil; beef, 2.56 lbs soybean oil.

[28] Energy Intensity = 63,000 Btu/1973 dollar; (35,500 without energy sectors) Job Intensity = 6.9 Jobs/100,000 1973 dollars (7.1 without energy sectors) Estimated from the inflation and productivity changes calculated from Bureau of Labor Statistics, U.S. Department of Commerce, "Handbook of Labor Statistics, 1974, Washington, D. C., Tables 83 (total private), 1972 and 1973, and reference 98, Table 5. Energy and Labor intensity of Personal Consumption without direct energy purchases; R. Herendeen, B. Segal and D. Amado, "Energy and Labor Impact of Final Demand Expenditures 1963 and 1967," Tech. Memo. 62, Center for Advanced Computation, University of Illinois, Urbana, Ill. 61801 (October 1975), p. 8, 9.

[29] "Food, Consumption, Prices, Expenditures," Supplement for 1973 to Agricultural Economic Report No. 138, Economic Research Service, U.S. Dept. of Agriculture, December, 1974.

[30] Land costs are not broken down, since for the plant proteins all the land used is in the farm step and in the beef programs it is divided between the cow-calf and feedlot steps. (As mentioned elsewhere, the land is farmland for growing; it does not include commercial establishments or even the land of the feedlots themselves. Grazing land <u>is</u> included.)

[31] Handbook of Labor Statistics 1974, U.S.D.L. Bureau of Labor Statistics, Bulletin 1825, 1974; Marketing and Transportation Situation, USDA-ERS, 195, Nov. 1974, pp. 16, 20, 21, 22; Survey of Current Busines, Bureau of Economic Analysis, U.S.D.C., Vol. 55, No. 6, June 1975; Current Business Statistics, pp. 5-1 thru 5-40; Agricultural Statistics 1974, USDA 1974, pp. 458-463, 436; New Energy Technology Coefficients and Dynamic Energy Models, Vol. II, ERDA-3, Jan. 1975, pp. 296, 297.

[32] "Farm Management: Facts and Opinions to Help You," Department of Agricultural Economics, Cooperative Extension Service, University of Illinois at Urbana-Champaign, Urbana, IL, March, 1975.

[33] Royce Hinton, Dept. of Agricultural Economics, University of Illinois at Urbana-Champaign, Urbana, IL, personal communication.

[34] Donnell Hunt, Dept. of Agricultural Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, personal communication.

[35] Fuel Department, FS Cooperative, Bloomington, IL, personal communicatio

[36] Dean Baldwin, Dept. of Agricultural Economics, The Ohio State University, Columbus, OH, personal communication.

[37] "Cost of Storing and Handling Grain and Controlling Dust in Commercial Elevators," ERS 513, USDA, 1973.

[38] Penner, Peter, "Summary of Transport Characteristics for Vehicular Freight Transportation, 1971," CAC Tech. Memo. 45, Center for Advanced Computation, University of Illinois, Urbana, IL.

[39] Carl Vosloh, Jr., Economic Research Service, U.S. Department of Agriculture, Washington, D. C., personal communication.

[40] See Appendix B.

[41] Soybean Bluebook, 1974.

[42] James Selner, Archers Daniel Midlands, Decatur, IL, personal communication. A figure of \$6/ton was used, with an estimated \$2/ton of this for labor.

[43] Dave Dance, Alpine American Corp., Saxonville, MA, personal communication.

[44] The weighting factors are based on the total amount of grain handled. For receiving, the percentages are 99.8% by truck and .2% by rail. For outshipment, the percentages are 44.1% by rail, 42.9% by truck, and 13% by water.

[45] Gary Johnston, Engineering Manager, Wenger International, Inc. Kansas City, MO, personal communication.

[46] Shao Soo, Department of Mechanical and Industrial Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, personal communication. Energy figure is requirement at point of consumption, i.e., not the fossil fuel equivalent.

[47] Northern Illinois Water Company, Champaign, IL.

[48] Oak B. Smith, President, Wenger International, Inc., Kansas City, MO, personal communication.

[49] Textured Soy Protein is packaged by Dean Foods, Franklin Park, IL, for Eisner Food Stores, Champaign, IL.

[50] Hannon, B., "System Energy and Recycling: A Study of the Beverage Industry," Document No. 23, Center for Advanced Computation, University of Illinois at Urbana-Champaign, Urbana, IL., Jan. 5, 1972, revised March 17, 1973, Table 4.

[51] Esther Schmitt, International Paper Co., Chicago, IL, personal communication.

[52] Kirkpatrick, K., "Independent Verification of I/O Energy Results," Technical Memo. 26, Center for Advanced Computation, University of Illinois at Urbana-Champaign, Urbana, IL, July, 1974.

[53] John Peterson, Wickes Agriculture, Saginaw, MI, personal communication.

[54] Mike Quade, Dean Foods, Franklin Park, IL., personal communication. The textured soy protein is transported from Decatur, IL, to Franklin Park, IL, and thence to Champaign, IL.

[55] "42nd Annual Report of the Grocery Industry," Progressive Grocer, April, 1975, p. 136.

[56] "Distribution of the Food Dollar by Marketing Function and Expense Item," Marketing and Transportation Situation, National Economic Analysis Division, Economic Research Service, U.S. Department of Agriculture, Washington, D. C., November, 1974.

[57] Paul Schulz, Director, Marketing Services, National-American Wholesale Grocers' Association, New York, New York, personal communication.

[58] This may appear low to those who would claim that the comparison should be between beef and <u>hydrated</u> textured soy proteins. We note that the texturing process is by extrusion cooking; the home preparation involved is really more analogous to reheating than to actual cooking.

[59] Ted Leiprandt, Co-op Bean Co., Pigeon, MI, personal communication.

[60] Chuck Roth, Wickes Agriculture, Saginaw MI, personal communication.

[61] American Society of Heating, Refrigerating and Air-Conditioning Engineers, ASHRAE Guide and Data Book, 1970 Systems, New York, New York. Data is for Peoria, IL, figuring 6025 heating degree days.

[62] Peterson, Dept. of Mechanical Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, personal communication.

[63] "Heating and Air Conditioning," Burgess H. Jennings, International Textbook Company, Scranton, 1956

[64] The calculation may be
(.3 Btu/hr-ft^2-°F)(4500 ft^2)+(27,000 ft^3/hr)(.075 lb./hr.)(.24 Btu/lb.
= (1350 Btu/hr.-°F)+(486 Btu/hr.-°F)
= 1836 Btu/hr.-°F
For Peoria, at 6025 heating-degree days per year,
(1836 Btu/hr.-°F)(6025°F-days/yr)(24 hrs./day)
= 2.655 x 10^8 Btu/yr.

[65] Vern Brooks, Lighting Engineer, GTE Sylvania, Melrose Park, Illinois, personal communication.

[66] Don Koberowski, Triangle Package Machinery Company, Chicago, Illinois, personal communication.

[67] Jeff Rudersall, Ferrell-Ross, Saginaw, MI, personal communication.

[68] The machinery investigated and the total yearly amount of electricity allotted to each ore as follows: garner bin, 1875 kWh; cleaner, 28,000 kWh; conveyors, 5,615 kWh; feeders-weighing heads, 1,250 kWh; bag machines, 11,500 kWh; air conditioning units, 4,600 kWh; miscellaneous (10 h.p.), 18,650 kWh. TOTAL = 71,490 kWh.

[69] Cliff Peterson, D & D Bean Company, Greely, CO., personal communication.

[70] Charles Wolfenberger, U.S.I., Tuscola, IL, personal communication.

[71] "Energy Implications of Polymer Production and Use," L. Teasley, Washington University, St. Louis, MO, Dec. 1974.

[72] Berry, S., Long, T., and Makino, H., "An International Comparison of Polymers and their alternatives," Energy Policy, June, 1975.

[73] From [71], "raw" polyethelyne has an energy content of 46,840 Btu/lb. Film fabrication requires another 6,594 Btu/lb (15).
Total = 53,434 Btu/lb.
(53,434 Btu/lb.)/(120 bags/lb.) = 445.3 Btu/bag.

[74] Kirkpatrick, "Effect of Including Capital Flows on Energy Coefficients, 1963," Tech. Memo. No. 32, Center for Advanced Computation, University of Illinois at Urbana-Champaign, Urbana, IL, August, 1974.

[75] From [1], production for a small operation would approximate 3000/bags/hr. Operation assumed is medium-sized, 7000 bags/hr.
(7,000 bags/hr.)(10/hrs./day)(5 days/week)(50 weeks/yr.)
= 1.8×10^7 bags/yr.

[76] Assumed to be the same as the transportation cost to the wholesaler in the textured soy protein system.

[77] "Distribution of the Food Dollar by Marketing Function and Expense Item," Marketing and Transportation Situation, National Economic Analysis Division, Economic Research Service, U.S. Dept. of Agriculture, Washington, D. C., November, 1974.

[78] Roy Chisholm, G.E., Louisville.

The information is based on a test conducted by General Electric on a chile con carne dish consisting of ground beef, tomatoes, water, and 4 cups of kidney beans, cooked in a two-quart saucepan. The chile con carne was brought to a boil and then simmered for one hour. Bringing to a boil required 546.1 Btu and simmering for one hour required an additional 1,023.9 Btu. We analogize to bean cooking by assuming a 2-qt. load of hydrated beans and water (6 cups of hydrated beans and 2 cups standing water).

We can calculate the energy required to bring the soybeans to 212°F from room temp (72°F) by using the fact that the specific heat of water is 1 (by def.) and the specific heat of a dry soybean is .3 Btu/lb.-°F [79].

(.3 Btu/lb.-°F)(2 cups soybeans)(.4028 lbs./cup)(140°F)/.665 efficiency
= 50.9 Btu for the beans.
(1 Btu/lb.-°F)(3.12 lbs)(140°F)/.665 efficiency
= 657 Btu for the H_2O
TOTAL = 707.9 Btu for preheat.

It is reasonable to assume that energy requirements of simmering are the same for both systems, since we are really just accounting for heat loss. Therefore (1,023.9 Btu/hr.)(2 hrs) + 707.9 Btu = 2,755.7 Btu/2 cups. (This does not reflect fossil fuel equivalents.)

[79] Marvin Sternberg, Department of Food Science, University of Illinois at Urbana-Champaign, Urbana, IL, personal communication.

[80] "Cooking with Soybeans," Cooperative Extension Service, College of Agriculture, University of Illinois at Urbana-Champaign, Urbana, IL, Circular 1092.

[81] Doug DeWerth, AGA Labs, Cleveland, OH.
Assuming a 48% efficiency, we calculate the amount of energy to raise to a boil in a manner analogous to that used in [78].
(1 Btu/lb.°F)(3.12 lbs.)(140°F)/.48 = 910 Btu for H_2O
(.3 Btu/lb.-°F)(2 cups)(.4028 lbs/cup)(140°F)/.48 = 70.5 Btu for beans.
(910)+(70.5) = 980.5 Btu for preheat.
For simmering energy we note that it was figured in [78] that 2,047.8 Btu were required for 2 hours of simmering at .665 efficiency. At .48 efficiency, the figure would be 2837.1 Btu. Therefore, the total cooking energy directly used is
(2837.1)+(980.5) = 3817.6 Btu/2 cups dry soybeans.
(This does not reflect fossil fuel equivalents.)

[82] Dr. R. Van Arsdall, University of Illinois, Urbana, Illinois; Dr. Cal Boykin, Texas A & M, College Station, Texas; Dr. Jack Tuerweiller, Oregon State, Corvallis, Oregon. Each of these men gave much time and effort in helping obtain information.

[83] See discussion of CAC matrix, III B.

[84] Dr. Van Arsdall set up a hypothetical 200 head feetlot in order to disaggregate a cagegory containing fuel, equipment, shelter, and depreciation for the Cornbelt Feedlot. Dr. Boykin suggested the use of data from a 20,000 head feedlot in Arizona from The Arizona Cattle Feeding Industry, Agricultural Experiment Station, University of Arizona, Tucson, Arizona, Ted. Bulletin 191, Jan. 1972 to disaggregate this same category in the Texas Panhandle and California Feedlot.

[85] Hirst, E., "Energy Use for Food in the United States," ORNL-NSF-EP-57, Oak Ridge National Laboratory, Oak Ridge, Tennessee, October, 1973, p. 27.

[86] Hirst, E., "Direct and Indirect Energy Requirements for Automobiles," ORNL-NSF-EP-64, Oak Ridge National Laboratory, Oak Ridge, Tennessee, February, 1974, Table 6, p. 17.

[87] "Major Statistical Series of the U.S. Department of Agriculture, Vol. 4: Agricultural Marketing Costs and Changes," Agricultural Handbook No. 365, United States Department of Agriculture, Washington, D.C., June, 1970, Table 1.

[88] "Food Consumption Prices Expenditures," Supplement for 1973 to Agricultural Economic Report No. 138, Economic Research Service, United States Department of Agriculture, December, 1974, Tables 1, 8, 10, 11, 12, 13, 15, 16, 18, 21, 22, 23, 24, 26, 27, 28, 30 and 36.

[89] Many items were already on a weight basis. The rest were converted to pounds on the basis of empirical research conducted at a grocery store in Champaign, IL. (i.e., I weighed the things).

[90] Table AA lists what groceries were assumed to be refrigerated.

[91] Edison Electric Institute, New York, N.Y.

[92] Merchandising Week, February, 1974, various tables.

[93] Ruffin, M.D. and Tippett, K.S., "Service-Life Expectancy of Household Appliances: New Estimates from the USDA," Home Economics Research Journal, March, 1975, Vol. 3, No. 3.

[94] Redstrom, R.A., "Practices in the Use of Homefreezers," Home Economics Research Report No. 38, Agricultural Research Service, United States Department of Agriculture, Washington, D. C., June, 1971.

[95] The 1973 saturation level for gas ranges was 51.2%; for electric ranges, 51.9%. Figures are from [10].

[96] DeWerth, D. W., "Energy Consumption of Contemporary 1973 Gas Range Burners and Pilots Under Typical Cooking Loads," Research Report No. 1499, American Gas Association Laboratories, Cleveland, OH, May, 1974.

[97] Roy Chisholm, General Electric Co., Louisville, KY, personal communication.

[98] Hannon, Bruce, "Energy Conservation and the Consumer," Science, Vol. 189, No. 4197, pp. 95-102. See also B. Hannon, "Energy Growth and Altruism," Mitchell First Prize Paper, Limits to Growth, Thayer School of Engineering, Dartmouth University, New Hampshire (Oct. 21, 1975).

[99] Basic Petroleum Data Book, Petroleum Industry Statistics, American Petroleum Institute, 2101 L Street Northwest, Washington, D. C., 20037.

[100] "Gas Facts," American Gas Association, Dept. of Statistics, Arlington, VA, 22209.

[101] This calculation assumes a composite, composed of Texas, 40.1%; Cornbelt, 41.0%; and Intermountain, 18.9%. Based on Reference [1].